CANADA
DEPARTMENT OF MINES AND TECHNICAL SURVEYS

MINES BRANCH
INDUSTRIAL MINERALS DIVISION

INDUSTRIAL WATER RESOURCES OF CANADA

WATER SURVEY REPORT NO. 6

FRASER RIVER DRAINAGE BASIN, 1950-51

By
J. F. J. Thomas

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SCALE OF MILES

100 0 100 200 300 400 500

FIGURE 1. MAP SHOWING DRAINAGE BASINS UNDER STUDY IN WESTERN CANADA

INDUSTRIAL WATER RESOURCES OF CANADA

Chemical Quality of Surface and Municipal Water Supplies in the Fraser River Drainage Basin, 1950-51

INTRODUCTION

This report is the sixth in a series on the chemical quality of surface and municipal water supplies available for industrial and domestic use in Canada. Report No. 1[1] outlines the scope and procedures used in the country-wide survey and discusses the interpretation of analytical results to be recorded in subsequent reports. Reports No. 2[2] and 3[3] cover the results of studies on the Ottawa River and Upper St. Lawrence River-Central Great Lakes drainage basins respectively.

This report and reports Nos. 4 and 5 cover the areas and drainage basins in British Columbia outlined in Figure I. It will be noted that these three reports cover all of British Columbia except the northern portions drained by the Yukon and Mackenzie River systems, which areas will be covered in Report No. 8, now in preparation.

The northern portion of the province, in particular the northern portion of Fraser River and western portion of Skeena River basins, is now the centre of considerable industrial activity and it is expected that expansion of both industry and agriculture in these areas, now relatively sparsely settled, will necessitate more detailed studies of water quality in the near future.

The method of presentation of data on this watershed is similar to that of previous reports and no attempt has been made to discuss in detail all the information recorded in this report or obtained during the survey. Part I tabulates the analytical results of daily, monthly and spot sampling of surface waters in the basin. Part II reports similar analytical data obtained on municipal waters within the basin and also includes information on the operation of most of the organized water systems.

The co-operation and assistance given to the writer by W. C. Warren, District Engineer, and other engineering personnel of the Water Resources Division, Dept. of Resources and Development, Vancouver, B.C. in selecting sampling locations and in supplying the data on river and lake stage and river discharge, used in this report, is gratefully acknowledged.

The co-operation of municipal officials and water works engineers who supplied the writer with information on their waterworks systems by correspondence or during visits to their communities, is also greatly appreciated.

FRASER RIVER DRAINAGE BASIN

The Fraser River, 850 miles in length, with its many tributaries drains about 91,660 square miles, all of which is in British Columbia except for some 220 square miles in the United States, south of Sumas, B.C. This river and its larger tributaries provide the passes and valleys that permit crossing the mountainous terrain of British Columbia. The railways and Trans-Canada Highway follow the South Thompson (206 miles in length), the Thompson and the lower Fraser River to the sea. Travel from the earliest days into the central areas of British Columbia, in particular the Cariboo and north western portion of the province, has been along the Fraser River and its central plateau. The Canadian National Railway follows the upper Fraser River, its large tributary, the Nechako River (287 miles in length) and the Skeena River to the coast at Prince Rupert.

The Fraser River, rising in the Rocky Mountains just west of the source of the large North Saskatchewan and Athabasca Rivers, flows through almost all types of terrain found in British Columbia. It flows west skirting the Cariboo Range then south along the central plateau lying between the coastal range and Cariboo and Monashee mountain Ranges, then south and west through the coastal range to the sea.

One of the most fertile and heavily-populated areas in British Columbia and indeed in all Canada has developed on the delta of the Fraser River. Here the rich alluvial soil, and a climate tempered by the Japanese current, with abundant rainfall, has given rise to intensive farming particularly of small fruits and vegetables. The abundant rainfall along the coastal range and plain has resulted in heavy forestation and led to the formation of a large lumbering industry with headquarters in the delta area.

[1] Industrial Water Resources of Canada (Water Survey Report No. 1): Scope, Procedure, and Interpretation of Survey Studies, Mines Branch Report No. 833, Dept. of Mines and Technical Surveys, Ottawa, 1952.

[2] Industrial Water Resources of Canada (Water Survey Report No. 2): Ottawa River Drainage Basin, Mines Branch Report No. 834, Dept. of Mines and Technical Surveys Ottawa, 1952.

[3] Industrial Water Resources of Canada (Water Survey Report No. 3): Upper St. Lawrence River-Central Great Lakes Drainage Basin in Canada, Mines Branch Report No. 837, Dept. of Mines and Technical Surveys, Ottawa. (In press.)

Although rainfall is less abundant in the interior plateau of the Fraser Basin, particularly the Cariboo region, the country is ideal grazing land. The wide valleys and plateaus in the upper Fraser, Nechako, Stuart and South Thompson River basins are now being opened to farming and industry. As in other parts of the province the river valleys are extremely fertile but there are only two large areas in the entire province with great agricultural possibilities, the Peace River block lying in the drainage basin of the Mackenzie River, and the Stuart Lake district. Both these areas are rapidly being opened to farming and industry.

As with any large river system in a mountainous region, the rivers are the lifeblood of the country. It is such tributary rivers as the North Thompson, 210 miles in length, the Chilcotin, 146 miles in length, and the West Road River, 140 miles in length, that are permitting the settlement and opening up of this province, rich in natural resources and industrial potential.

In all its length Fraser River is a turbulent, silt-laden stream, for the most part too rapid for transportation. This is also true of most of the tributary rivers except those in the upper lake regions of South Thompson, Nechako and Stuart Rivers, or those flowing for the most part in plateau areas.

SURVEY PROCEDURE

The methods of sampling and survey procedure employed in this investigation were in general similar to those outlined in previous reports and given in detail in Water Survey Report No. 1[1]. The Fraser River system was studied during 1950-51, at the same time studies were carried out on water quality in the Skeena River basin[2]. Twenty sampling stations were operated in this watershed, two daily stations, and eighteen monthly stations.

At the daily stations samples were collected each day into 16 ounce, pressure-sealed bottles which were shipped thrice monthly by the collector to the British Columbia Research Council at Vancouver. Here data regarding the daily water temperature, water level, etc., were recorded, each daily sample tested for specific conductance and a 10-day composite sample prepared. These composite samples were tested for pH, colour, turbidity, specific conductance and alkalinity and then shipped to the Mines Branch laboratory at Ottawa where a complete analysis was carried out.

The monthly samples were shipped directly by the collector to the laboratory in Ottawa. Whenever possible, samples were also obtained from these stations when the river was at high and low flow.

During the summer of 1950, most of the accessible portion of the basin was travelled with a mobile laboratory, and municipal waters and additional samples of river and lake waters were collected and field-tested.

ANALYTICAL PROCEDURE

The methods of analyses and the method of reporting analytical results used in this survey are essentially those outlined in detail in Water Survey Report No. 1.

Until June 15, 1950, all samples received in the Ottawa laboratory were stored unopened in the dark until analyses could be started. It will be noted from Table II that storage time on these earlier samples was usually quite brief. After June 15, 1950, all samples received in the laboratory were immediately tested for pH, colour, turbidity, alkalinity, specific conductance, total hardness and, sometimes, chloride and calcium ion content. Previous experience had shown that these determinations are those normally affected by storage. However, storage time on these samples is still reported as the total time elapsing between sampling and the beginning of final analysis, even though waters after June 15th were usually tested for the unstable constituents within a much shorter period.

The tests carried out by the British Columbia Research Council on composite samples were all repeated in the Ottawa laboratory. A comparison of maximum and minimum individual differences and the arithmetical mean or average of all test results in each laboratory shows that, as in previous work in the two laboratories, the major differences are in the determinations for colour and turbidity. The individual differences in these determinations, particularly colour, was in some cases quite large, and was to be expected because of the turbid nature of many of the waters. Colour determined in the British Columbia Research Council laboratories is in many cases "apparent colour" due to turbidity of the waters whereas in the Ottawa laboratory colour was determined normally on the supernatant or settled sample. It is well known that storage of waters may cause bleaching or loss of colour and coagulation or settling of turbidity. However, even though storage time when "immediate testing" was carried out at Ottawa was on the average almost twice as long as when tests were made in British Columbia, the described survey procedure does give quite satisfactory agreement for pH and alkalinity, two important values that often show considerable changes on storage. The maximum variation in pH between the laboratories on any one sample was 0·5.

[1] Industrial Water Resources of Canada (Water Survey Report No. 1): Scope, Procedure, and Interpretation of Survey Studies, Mines Branch Report No. 833, Dept. of Mines and Technical Surveys, Ottawa, 1952.

[2] Industrial Water Resources of Canada (Water Survey Report No. 5): Skeena River Drainage Basin, Vancouver Island, and Coastal Areas of British Columbia, 1949-51, Mines Branch Report No. 839, Dept. of Mines and Technical Surveys, Ottawa, 1953.

PART I

SURFACE WATERS OF THE FRASER RIVER DRAINAGE BASIN

Daily samples were collected of Fraser River from the railway bridge at Mission City, and of Thompson River from the highway bridge at Kamloops, during the period February, 1950 to February, 1951. When field work was being carried out in 1950 it was found that sampling at the latter station was from the southern side or Kamloops side of the river and that in many cases the water was probably South Thompson River water. This location is just below the junction of North and South Thompson Rivers and indications were that, at least during much of the year, complete mixing of the river waters does not occur.

During the summer of 1950 additional samples of surface waters and municipal water supplies within the basin were collected. The locations of all surface water sampling points within this watershed are outlined in Appendix A and are shown on the map of the basin, Figure 2 (in map pocket). As in other basins in this province, various areas, in particular the northern and northeastern portion of the basin, were inaccessible by road and consequently several large tributary rivers were not studied. Since these rivers either have their source in the same general area or traverse the same type of terrain as nearby streams which were studied it is believed that the quality of their waters can be assumed similar in character. These inaccessible areas are only sparsely settled and domestic and industrial use of the river waters is at present practically nil.

Most samples collected during field work in the summer were tested immediately in the mobile laboratory for the constituents and properties that may change on storage. These field results are reported in Tables II and III in brackets beside the results found later in the laboratory. Repetition of these tests indicates changes in water due to storage and enables estimation of the quality of the water *in situ*.

Table I tabulates available information on the influence of tides on Fraser River water. No special study was made in this regard at this time and the data shown in Table I were supplied by the Water Resources Division, Department of Resources and Development.

TABLE I

Tidal Influence—Fraser River

A. Rising Tide

Sampling Location	River Discharge at Hope, B.C. (second-feet)	River Depth at Sampling (feet)	Sampling		High Tide		Low Tide		Chloride Content, p.p.m.		
			Date	Average Time	Time	Height† feet	Time	Height† feet	1/5*	3/5*	4/5*
Steveston	27,100	13·5	13/12/48	12·25	14·28	12·4	9·15	9·3	15·02	.....	85·86
	128,000	8·0	26/ 4/49	13·21	17·33	12·2	11·15	5·0	4·9	.....	4·5
	318,000	9·0	17/ 5/49	19·10	23·19	14·7	15·22	2·3	3·2	.....	3·3
	121,000	8·5	20/ 8/49	15·45	16·52	13·4	8·56	3·0	3·3	.....	3·0
Woodward's Landing (main river channel)..	27,100	18·5	13/12/48	11·40	14·28	12·4	9·15	9·3	45·5	.....	72·8
	128,000	15·0	26/ 4/49	13·52	17·33	12·2	11·15	5·0	0·61	.....	0·49
	318,000	25·0	17/ 5/49	18·45	23·19	14·7	15·22	2·3	0·61	.....	0·73
	121,000	21·4	20/ 8/49	15·00	16·52	13·4	8·56	3·0	0·36	.....	0·36
At Fraser Ave. Bridge (Vancouver)... North arm of river	27,100	15·0	13/12/48	10·35	14·28	12·4	9·15	9·3	15·2	.....	17·5
	128,000	12·0	26/ 4/49	14·17	17·33	12·2	11·15	5·0	0·36	.....	0·30
	318,000	10·5	17/ 5/49	18·30	23·19	14·7	15·22	2·3	0·24	.....	0·24
	121,000	10·5	20/ 8/49	14·15	16·52	13·4	8·56	3·0	0·36	.....	0·36
New Westminster	27,100	18·0	13/12/48	13·52	14·28	12·4	9·15	9·3	1·8	.....	6·1
	128,000	10·5	26/ 4/49	15·32	17·33	12·2	11·15	5·0	0·36	.....	0·30
	318,000	11·5	17/ 5/49	17·15	23·19	14·7	15·22	2·3	0·49	.....	0·49
	121,000	9·6	20/ 8/49	13·00	16·52	13·4	8·56	3·0	0·43	.....	0·43
Mission City	318,000	19·4	17/ 5/49	15·30	23·19	14·7	15·22	2·3	0·49	.....	0·55
	121,000	15·4	20/ 8/49	11·0	16·52	13·4	8·56	3·0	0·49	.....	0·49
Chilliwack (at Rosedale ferry)	121,000	13·5	20/ 8/49	9·40	16·52	13·4	8·56	3·0	0·36	.....	0·43

* Fraction of river depth (column 3) at which sample for chloride content was taken—for example, line 1, 15.02 p.p.m. Cl at ⅕ of 13.5 ft., or at 2.7 ft.

† Above lowest of normal low tides over a period of at least 7 years; reference Vancouver Harbour, B.C.

TABLE I—Concluded

Tidal Influence—Fraser River—Concluded

B. Receding Tide

Sampling Location	River Discharge at Hope, B.C. (second-feet)	River Depth at Sampling (feet)	Sampling		High Tide		Low Tide		Chloride Content, p.p.m.		
			Date	Average Time	Time	Height feet	Time	Height feet	1/5*	3/5*	4/5*
Mission City	27,100	23·0	13/12/48	16·20	14·28	12·4	22·17	1·9	0·61	.....	0·61
	128,000	22·6	26/ 4/49	17·52	17·33	12·2	23·01	8·0	0·24	.....	0·18
Chilliwack (at Rosedale Ferry)	74,600	6·0	26/10/48	16·30	13·42	12·2	19·39	8·2	.....	1·1	.....
	27,100	14·0	13/12/48	17·32	14·28	12·4	22·17	1·9	0·55	.....	0·55
	128,000	16·0	26/ 4/49	19·30	17·33	12·2	23·01	8·0	0·24	.....	0·24
	318,000	16·0	17/ 5/49	13·30	7·11	11·6	15·22	2·3	0·55	.....	0·85
Hope	27,100	20·0	13/12/48	18·35	14·28	12·4	22·17	1·9	0·06	.....	0·06
	128,000	26·0	26/ 4/49	20·52	17·33	12·2	23·01	8·0	0·36	.....	0·36
	318,000	23·8	17/ 5/49	14·30	7·11	11·6	15·22	2·3	0·85	.....	0·85
	121,000	18·0	20/ 8/49	8·00	0·04	12·9	8·56	3·0	0·36	.....	0·43

Table II tabulates in detail the results of chemical analyses carried out on surface waters collected at the locations shown in Figure 2 (in map pocket). An average analysis is determined for the sampling period at all daily and monthly stations. This average is the arithmetical mean of each major constituent over the period and is not weighted as to river flow. Per cent sodium and the saturation index have also been calculated for these average waters. The reader is referred to Water Survey Report No. 1 for the interpretation of per cent sodium, saturation index and other values reported in Tables II and III. Boron has also been determined occasionally to indicate the suitability of the waters for irrigation.

Figure 3 shows graphically the variation in total and non-carbonate hardness in the Fraser River.

The relationships between river discharge or level and mineral content or chemical quality of the Fraser River at Mission City, the Thompson River at Kamloops and the Quesnel River near Quesnel, are graphically shown in figures 4, 5 and 6 respectively.

DISCUSSION

As in previous reports it is not proposed at this time to discuss in any detail the data reported in Table II. It will be noted however that most surface waters in this basin are soft or at the lower limit of medium hard using the following classification:

Soft water	Below 60 p.p.m. total hardness as $CaCO_3$.
Medium hard water	61—120 " " " " "
Hard water	121—180 " " " " "
Very hard water	Greater than 180 p.p.m. total hardness as $CaCO_3$.

In general, the rivers do not show any very marked variation in hardness or mineralization from season to season. However a large proportion of the waters are turbid and show considerable variation in turbidity.

Figure 3 shows graphically some decrease in hardness of Fraser River water as it approaches the sea, which can generally be explained by considering the character and volume of tributary waters entering the main river. Those which flow into Fraser River from the west or from the coastal range, are usually softer in character than those entering from the southern or eastern portion of the basin, even though the latter are not particularly hard. The head waters of Fraser River, which rise in the calcareous Rocky Mountains are, as expected from studies in the Columbia River system, somewhat harder in character. Certain tributary waters are also noticeably different in character, usually harder, as for instance, those from the Merritt area and those from the Cariboo Range or Lac la Hache area.

Figure 4 shows a close relationship between specific conductance and total hardness of Fraser River water at Mission City. The variation in both is quite small in comparison with the wide variation in flow which is paralleled by changes in turbidity. Figure 4 therefore indicates that Fraser River in flood carries a proportionately increased amount of silt but that this silt is relatively insoluble and does not affect to any great extent the mineralization of the water; that is, run-off water which produces flood conditions is not much different in dissolved mineral content than that found at normal river flow.

Figure 5 shows that a somewhat similar relationship exists in the Thompson River at Kamloops although the water is lower in hardness and total mineralization. The major difference is the lack of turbidity in the Thompson River. Even during flood the turbidity never increases enough to cause trouble for most industrial uses.

Figure 6 illustrates that tributary waters from the east central portion of the basin or Cariboo mountains are somewhat harder, but relatively constant except for a marked increase in turbidity during the flood period. During periods of low flow the Quesnel River increases in mineralization, especially sulphate ion content.

Since many of the tributary rivers are clear streams in comparison with the turbid and rapid Fraser River it is found that mixing of the tributary is often not complete for some distance downstream from the junction. A notable example of this is seen at Prince George, the clear Nechako River being visible (in the milky Fraser River) for many miles below Prince George.

Table I indicates that serious contamination of Fraser River water with seawater by tidal action is not found much above Steveston and here only when the tide is rising and river discharge is low.

The influence of incoming tide, shown by increasing chloride ion content, is noted in the river up to New Westminster when river discharge is low, but the effect is very small. From the combinations of sampling times, river discharges and tides shown in Table I it is seen that although tides may influence Fraser River levels for a considerable distance upstream they have little effect on water quality much above Steveston or possibly Woodward's Landing, insofar as industrial use is concerned.

As expected, tides entering the river tend to flow along the bottom of the river; this is indicated by the higher salinities at greater sampling depths.

SUMMARY

Surface water supplies within the Fraser River basin are relatively constant in quality. While the main river itself differs from most British Columbia rivers by its constant turbidity it is not a hard water. Some of the cloudiness or turbidity in Fraser River water may also be due to the turbulence and saturation of the water with air and air bubbles, which gives the water a milky appearance. This turbulence also tends to disperse and finely divide the insoluble matter carried by the river so that a considerable portion is in colloidal suspension. Tributary streams except for those entering from calcareous mountain regions are generally very soft to soft in character.

In general, except for the need for clarification of the Fraser River and some tributary waters, surface waters in the basin are satisfactory for industrial use. There is generally an abundance of water available within the watershed for industrial use with little or no treatment required. However, satisfactory clarification of a turbid water such as Fraser River water does present a problem for certain uses.

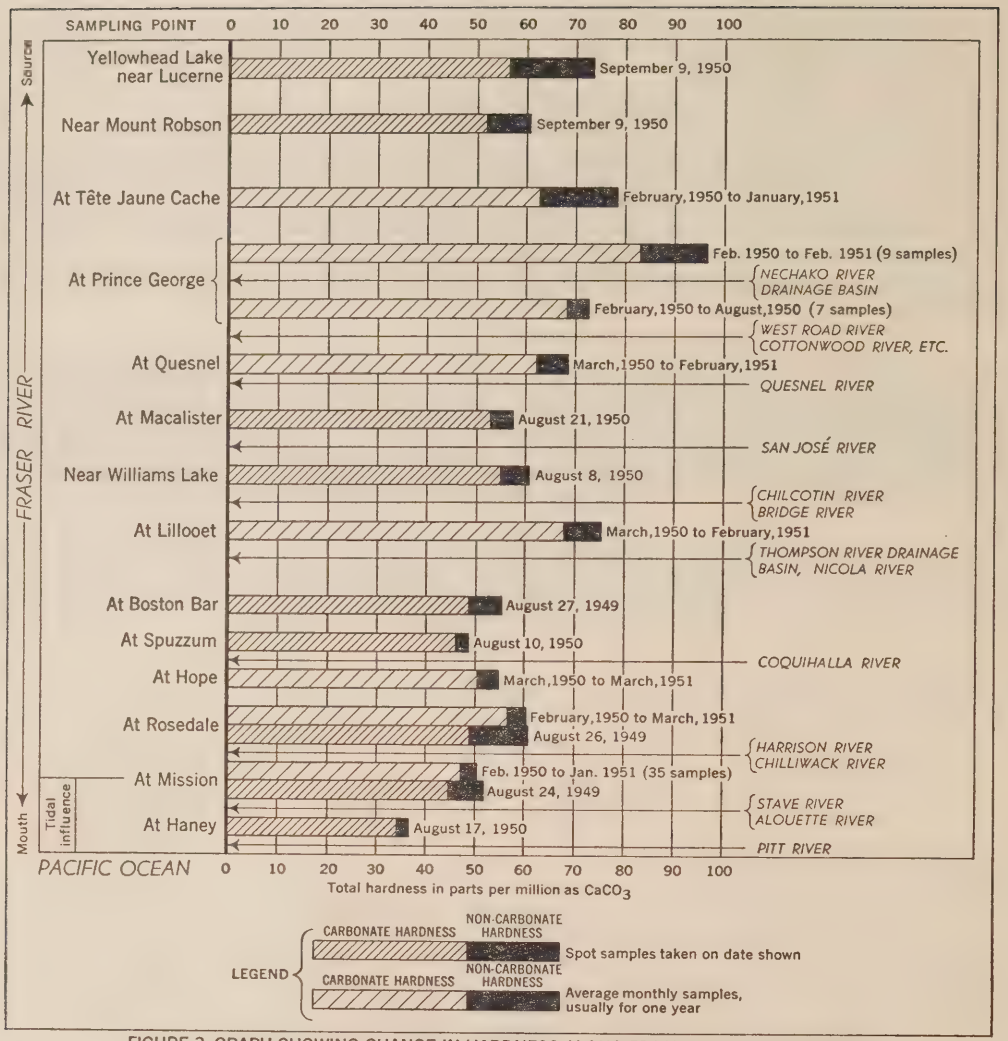
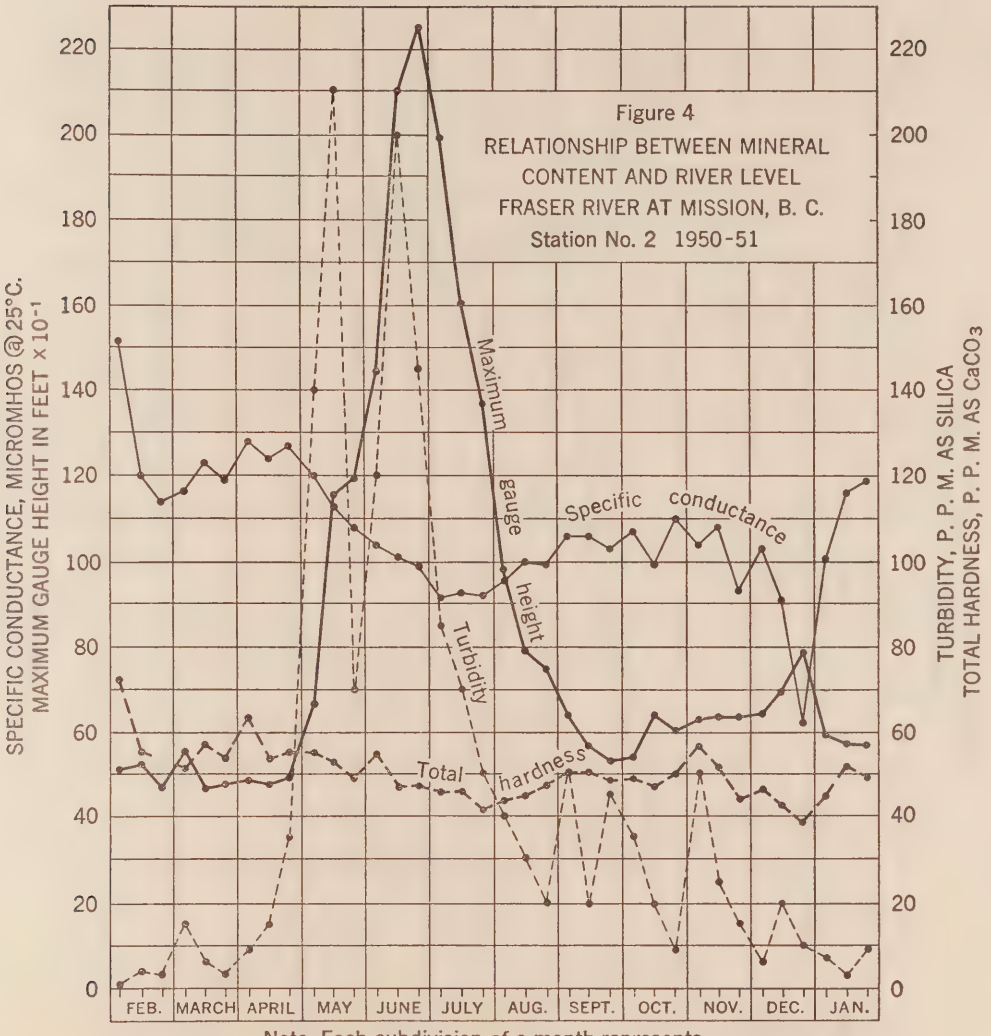
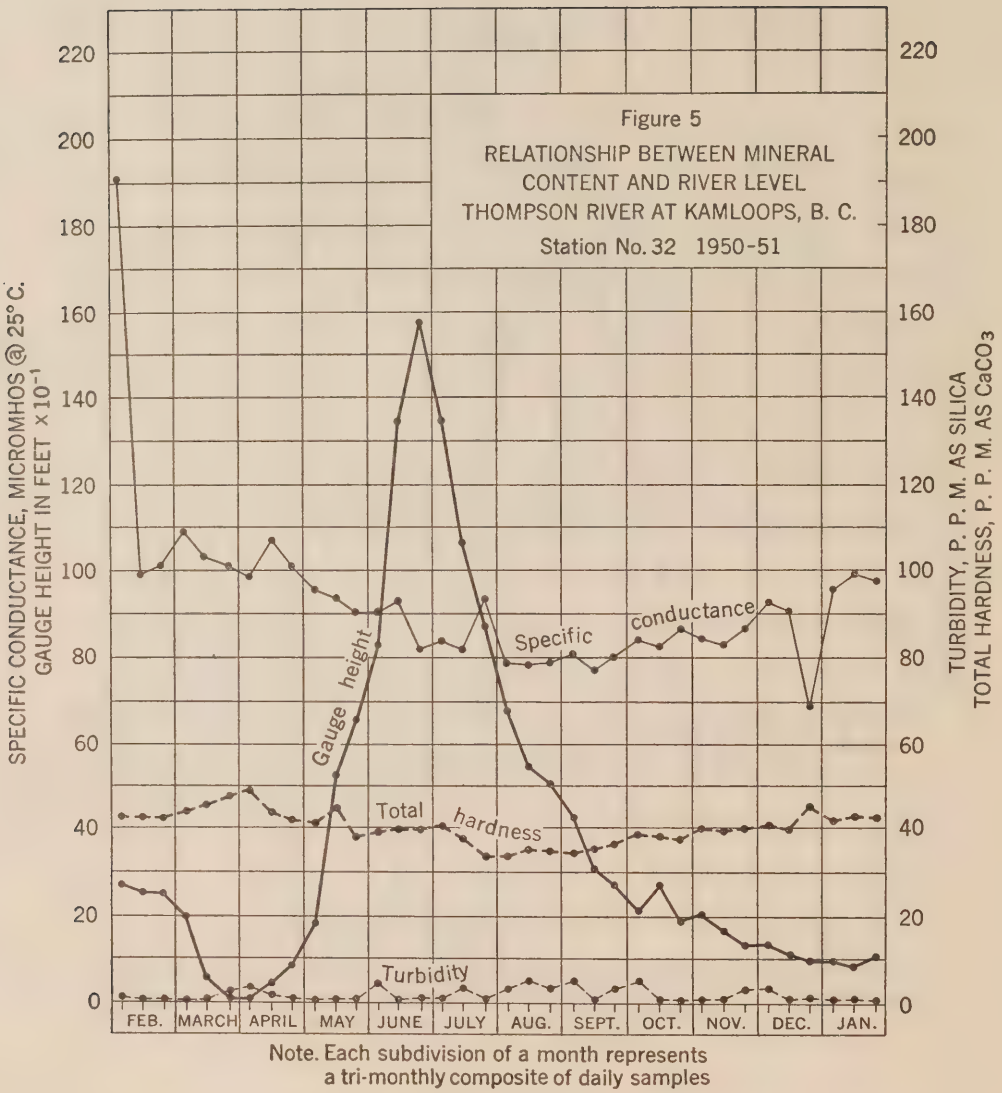


FIGURE 3. GRAPH SHOWING CHANGE IN HARDNESS ALONG FRASER RIVER WATERSHED



Note. Each subdivision of a month represents a tri-monthly composite of daily samples



Note. Each subdivision of a month represents a tri-monthly composite of daily samples

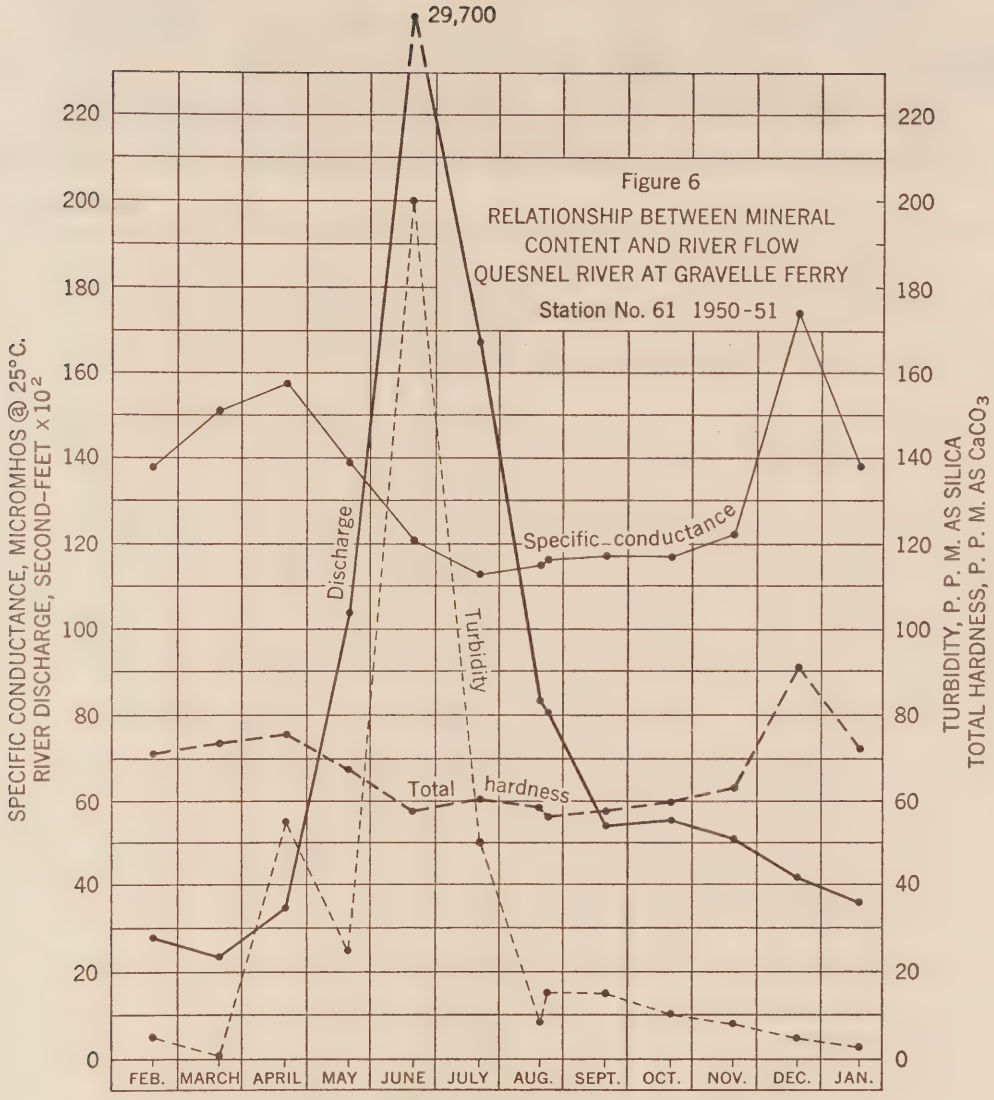

29,700
Figure 6
RELATIONSHIP BETWEEN MINERAL CONTENT AND RIVER FLOW
QUESNEL RIVER AT GRAVELLE FERRY
Station No. 61 1950-51
SPECIFIC CONDUCTANCE, MICROMHOS @ 25°C.
RIVER DISCHARGE, SECOND-FEET ×10²
TURBIDITY, P. P. M. AS SILICA
TOTAL HARDNESS, P. P. M. AS CaCO₃
Discharge
Turbidity
Specific conductance
Total hardness
0
20
40
60
80
100
120
140
160
180
200
220
FEB.
MARCH
APRIL
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.
JAN.

TABLE II

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION NO. 1: FRASER																		
			Max.	Min.†	Max.	Min.												
1	Aug. 17/50...	116	7·85	6·71	8·37	7·48	64	..... (9·9)*	..... (2·0)	7·7 (7·7)	15 (5)	20 (15)	38	32	80·2	54·6	0·074	.....	6·2	11·5
STATION No. 2: FRASER RIVER																		
			Max.	Min.*	Max.	Min.*												
2	Aug. 24/49***	78	.....	.....	.....	.....	61	.....	.....	7·5	15	45	43	41	111	71·4	0·097	.....	12·8	16·8
3	Feb. 1-10/50.	32	5·19	1·10	.....	.....	33	.....	(1·7)	(8·1) 7·9	7	0·9	.....	.....	151	105	0·143	.....	7·0	21·5
4	Feb. 11-20...	29	5·24	1·54	5·06	1·43	36	.....	.....	7·6	5	4	9·4	6·6	120	77·4	0·105	.....	9·6	16·2
5	Feb. 21-28**.	.....	4·68	1·32	.....	.....	37	.....	.....	7·8	7	3	.....	.....	114	.....	.....	.....	.....	.....
6	Mar. 1-10...	31	5·55	2·31	.....	.....	37	.....	.....	7·9	5	15	32	29	116	75·2	0·102	.....	9·0	15·3
7	Mar. 11-20...	33	4·66	0·879	4·83	1·31	38	.....	.....	8·0	5	6	11	9·0	123	78·8	0·107	.....	5·8	17·0
8	Mar. 21-31...	37	4·77	0·782	.....	.....	40	.....	.....	7·7	10	3	.....	.....	119	89·4	0·122	.....	10·4	15·0
9	Apr. 1-10...	29	4·87	0·79	.....	.....	42	.....	.....	8·0	5	9	16	13	128	84·8	0·115	.....	10·6	17·2
10	Apr. 11-20...	30	4·75	1·73	4·84	1·51	43	.....	.....	8·0	5	15	44	40	124	75·8	0·103	.....	8·4	16·4
11	Apr. 21-30...	23	4·90	2·01	.....	.....	42	.....	.....	7·7	25	35	89	84	127	86·8	0·118	.....	9·6	16·6
12	May 1-10...	32	6·76	4·78	.....	.....	45	.....	.....	7·7	30	140	175	169	120	103	0·140	.....	17·6	16·7
13	May 11-20	36	11·57	10·56	10·16	8·99	48	.....	.....	7·7	35	210	261	252	113	84·0	0·114	.....	14·8	16·1
14	May 21-31...	25	11·97	11·38	.....	.....	49	.....	.....	7·6	25	70	104	99	108	78·6	0·107	.....	12·6	15·2
15	June 1-10...	37	14·49	14·04	.....	.....	52	.....	.....	7·8	10	120	128	120	104	147	0·200	.....	62·0	16·9
16	June 11-20...	55	21·00	19·64	19·34	18·58	56	.....	.....	7·8	40	200	267	258	101	74·6	0·101	.....	11·4	15·4
17	June 21-30...	45	22·55	22·07	.....	.....	55	.....	.....	7·7	25	145	187	181	99·0	71·8	0·098	.....	9·4	15·0
18	July 1-10...	71	19·96	19·62	.....	.....	59	.....	.....	7·8	20	85	106	101	91·5	71·4	0·097	.....	11·2	15·2
19	July 11-20...	71	16·01	15·57	16·46	16·07	60	.....	.....	7·9	10	70	8·8	6·0	93·1	69·8	0·095	.....	10·2	14·2
20	July 21-31...	101	13·67	11·17	.....	.....	62	.....	.....	7·9	10	50	80	77	92·3	61·8	0·084	.....	9·4	13·2
21	Aug. 1-10...	90	9·81	9·22	.....	.....	61	.....	.....	7·5	4	40	60	57	95·4	62·4	0·085	.....	15·2	13·5
22	Aug. 11-20...	92	7·92	6·95	8·37	7·48	64	.....	.....	7·6	5	30	47	45	100	67·0	0·091	.....	7·2	14·2

* Values in brackets refer to tests done in the mobile laboratory immediately after sampling.

(a) Discharge records are tentative data and subject to revision.

* River flow at this station is affected by tide as shown by maximum and minimum gauge levels; *see also* Table I.

** Results shown are preliminary tests carried out on composite sample by British Columbia Research Council; sample lost in transit.

*** Field sample, not included in average.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[c]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
RIVER AT HANEY																				
1·9	1·1	0·7	1·6	0·06	5·9	0 (0)	.....	0·05	.....	41·5 (40·3)	0 (0)	.....	5·8	2·5	36·5 (38·0)	47·4	6·0	.....	1·1	1
† Discharge records at Mission City, B.C.																				
FROM BRIDGE AT MISSION CITY.																				
2·4	1·4	0·9	1·0	0·02	10·2	0 (0)	Trace	0·10	.....	54·3 (53·7)	0 (0)	5·6	6·2	7·3	51·8	65·7	.....	.....	.....	2
4·5	2·9	1·0	.....	0·18	14·8	0	0·5	0·05	0	78·3	0	16·2	13·4	7·9	72·1	96·8	.....	.....	.....	3
3·6	2·2	0·8	0·57	0·06	15·5	0	0·7	0·05	.....	63·2	0	9·4	6·5	3·4	55·2	76·7	.....	.....	.....	4
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
3·2	2·2	0·7	1·8	0·13	18·5	0	0·5	0·05	.....	56·6	0	8·6	8·6	1·8	51·4	74·1	.....	.....	.....	6
3·6	2·6	0·9	1·1	0·06	16·6	0	0·5	0·10	0	62·0	0	6·6	7·5	6·4	57·2	79·3	.....	.....	.....	7
4·0	2·7	1·3	.....	0·14	9·1	0	0	0·15	.....	68·3	0	8·2	6·2	0	53·9	72·1	.....	.....	.....	8
5·0	2·7	0·9	0·93	0·11	13·0	0	0	0·05	0	65·9	0	8·6	9·2	9·5	63·5	80·5	.....	.....	.....	9
3·1	3·0	0·9	1·8	0·08	15·8	0	0·4	0·15	.....	61·0	0	6·6	7·0	3·7	53·7	76·7	.....	.....	.....	10
3·4	2·6	1·1	4·3	0·22	10·2	0	1·3	0·10	.....	65·9	0	8·6	7·0	1·4	55·4	74·9	.....	.....	.....	11
3·3	2·4	1·2	10·9	0·68	12·8	0	0·6	0·10	.....	66·9	0	.....	7·8	0·5	55·3	78·4	.....	.....	.....	12
3·1	2·2	1·0	17·8	0·27	6·1	0	0·7	.....	.....	64·4	0	.....	5·5	0·2	53·0	66·6	.....	.....	.....	13
2·8	1·8	0·9	5·8	0·33	7·6	0	0·5	0·05	.....	59·0	0	.....	5·9	1·0	49·4	64·0	.....	.....	.....	14
3·1	2·2	0·7	6·5	0·11	6·4	0	0·5	0·05	.....	57·8	0	.....	6·7	7·6	55·0	65·0	.....	.....	.....	15
2·1	1·8	0·8	12·5	0·20	5·6	0	0·7	0·10	0	56·1	0	.....	6·3	1·0	47·0	60·6	.....	.....	.....	16
2·4	1·6	0·7	10·2	0·27	5·8	0·2	0	0·10	.....	53·7	0	.....	5·7	3·3	47·3	58·1	.....	.....	.....	17
2·1	1·8	0·8	5·2	0·26	9·2	0	0·4	0·10	.....	50·0	0	.....	8·8	5·5	46·5	63·3	.....	.....	.....	18
2·5	1·6	0·7	3·7	0·22	6·9	0	0·4	0·05	.....	49·5	0	.....	6·2	5·1	45·7	57·0	.....	.....	.....	19
2·1	2·0	0·7	3·3	0·07	5·8	0	0·6	.....	.....	54·9	0	.....	5·7	0	41·5	57·1	.....	.....	.....	20
2·3	1·8	0·8	2·3	0·03	5·8	0	0·8	.....	0·01	48·8	0	.....	5·5	3·2	43·2	54·5	.....	.....	.....	21
2·3	2·0	0·5	2·3	0·06	7·6	0	0	0·10	.....	52·7	0	.....	7·7	1·7	44·9	60·3	.....	.....	.....	22

(b) Total refers to sum of hardness due to calcium and magnesium ions.
(c) Total iron increases with turbidity in many waters, indicating analyses of iron in colloidal and suspended matter.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet) On sampling date	Stream discharge* (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10⁶ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 2: FRASER RIVER FROM																		
	1950		Max.	Min.	Max.	Min.												
1	Aug. 21-31...	93	7·49	6·37	.....	.....	64	.....	.....	7·8	15	20	48	47	99·8	68·6	0·093	.....	6·2	15·2
2	Sept. 1-10...	97	6·41	5·44	.....	.....	62	.....	.....	7·8	5	50	56	50	106	68·4	0·093	.....	4·8	15·8
3	Sept. 11-20...	73	5·70	3·62	5·82	4·10	60	.....	.....	7·9	5	20	32	30	106	70·8	0·096	.....	6·0	15·7
4	Sept. 21-30...	63	5·35	3·25	.....	.....	58	.....	.....	7·7	2	45	26	25	103	66·4	0·090	.....	7·0	15·0
5	Oct. 1-10...	67	5·42	2·93	.....	.....	52	.....	.....	7·7	2	35	34	30	107	68·4	0·093	.....	6·6	15·1
6	Oct. 11-20...	110	6·41	4·30	5·96	3·58	49	.....	.....	7·6	20	20	33	30	99·7	65·4	0·089	.....	9·8	14·2
7	Oct. 21-31...	100	6·03	3·51	.....	.....	46	.....	.....	7·6	10	9	18	16	110	73·0	0·106	.....	11·2	15·2
8	Nov. 1-10...	109	6·32	4·05	.....	.....	43	.....	.....	7·7	15	50	67	61	104	76·8	0·104	.....	16·6	18·0
9	Nov. 11-20...	89	6·38	3·23	6·36	3·65	39	.....	.....	7·6	5	25	36	34	108	70·6	0·096	.....	9·4	16·0
10	Nov. 21-30...	73	6·37	3·65	.....	.....	40	.....	.....	7·4	15	15	29	27	93·3	61·8	0·084	.....	11·6	13·4
11	Dec. 1-10...	53	6·45	3·50	.....	.....	37	.....	.....	7·5	5	6	14	12	103	66·4	0·090	.....	11·0	14·0
12	Dec. 11-20...	59	6·94	4·26	7·13	4·51	40	.....	.....	7·3	10	20	13	11	90·3	61·0	0·083	.....	15·2	12·9
13	Dec. 21-31...	43	7·92	5·65	.....	.....	42	.....	.....	7·6	15	10	34	30	82·3	57·4	0·078	.....	10·8	11·7
14	Jan. 1-10/51	52	5·98	2·72	.....	.....	37	.....	.....	7·5	10	7	12	11	101	66·8	0·091	.....	10·8	13·8
15	Jan. 11-20...	42	5·74	1·81	5·81	2·15	37	.....	.....	7·4	10	3	.....	.....	116	81·2	0·111	.....	12·8	15·6
16	Jan. 21-31...	43	5·70	1·95	.....	.....	36	.....	.....	7·6	10	9	19	15	119	67·6	0·092	.....	9·6	14·7
17	Yearly Average (35 Samples)	59	8·36	6·15	8·34	6·11	47	.....	.....	7·7	10	45	.....	.....	107·9	76·0	0·103	.....	11·7	15·3
STATION No. 3: FRASER RIVER																		
			Gauge height in feet															
18	Aug. 26/49*..	76	.....	.....	62	.....	.....	7·5	15	50	50	49	109	73·0	0·099	.....	12·0	19·6
19	Apr. 5/50†..	12	1·57	2·64	39	.....	(1·5)	(8·3) 7·9	7	(45) 9	18	18	153	93·2	0·127	.....	7·2	20·5
20	Apr. 24.....	15	3·32	2·64	40	.....	.....	8·0	20	200	159	153	146	97·2	0·132	.....	8·6	20·3
21	May 29.....	38	13·24	11·56	48	.....	.....	7·9	10	70	.....	.....	116	.....	.....	.....	.....	15·8
22	June 28.....	42	19·42	18·48	57	.....	.....	7·8	40	150	163	158	98·9	75·0	0·102	.....	9·2	15·5
23	July 24.....	81	14·18	15·37	61	.....	.....	7·7	5	105	97	92	98·8	65·4	0·089	.....	9·8	16·9

* Field sample, not included in average.
† Extra sample, not included in average.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
BRIDGE AT MISSION CITY—*Continued*																				
2·4	1·8	0·7	2·0	0·05	7·6	0	0·4	0·10	.....	53·7	0	.....	6·8	3·8	47·8	61·4	.....	.....	.....	1
2·6	1·8	1·0	3·2	0·04	9·4	0	0·5	0	.....	53·7	0	.....	.....	6·1	50·1	57·5	.....	.....	.....	2
2·7	1·6	0·7	1·3	0·06	8·6	0	0·4	0·05	.....	59·0	0	.....	7·0	1·9	50·3	65·8	.....	.....	.....	3
2·6	1·8	0·7	1·0	0·06	8·6	0	0·4	0·05	.....	55·6	0	.....	4·8	2·5	48·1	62·5	.....	.....	.....	4
2·8	1·7	0·9	2·2	0·05	8·4	0	0	0·10	.....	56·1	0	.....	5·1	3·2	49·2	64·0	.....	.....	.....	5
2·8	2·2	1·0	1·5	0·10	8·2	0	0·5	0·10	.....	53·2	0	.....	7·0	3·4	47·0	63·8	.....	.....	.....	6
2·9	2·0	0·6	0·8	0·05	8·2	0	0·5	0·10	.....	57·3	0	.....	5·7	3·0	50·0	64·3	.....	.....	.....	7
2·9	2·3	0·8	1·4	0·09	17·6	0	0	.....	0	56·1	0	.....	3·0	10·8	56·8	73·2	.....	.....	.....	8
2·9	1·3	0·4	1·8	0·09	9·5	0	0·6	.....	.....	58·8	0	.....	7·5	3·6	51·8	69·0	.....	.....	.....	9
2·6	2·1	0·5	2·2	0·09	6·7	0	0·9	0·05	.....	51·2	0	.....	5·8	2·1	44·1	59·6	.....	.....	.....	10
2·8	2·3	0·3	0·9	0·10	6·3	0	0·9	0·05	.....	55·6	0	.....	6·7	0·8	46·4	61·8	.....	.....	.....	11
2·5	3·3	0·5	0·7	0·05	9·1	0	0·6	0·10	.....	48·8	0	.....	6·7	2·5	42·5	60·5	.....	.....	.....	12
2·3	1·8	0·5	1·7	0·11	4·4	0	1·3	0·05	.....	43·7	0	.....	5·2	2·9	38·7	50·6	.....	.....	.....	13
2·5	1·5	0·6	0·99	0·03	7·2	0	0·4	0·10	.....	51·5	0	4·4	4·6	2·5	44·7	61·5	.....	.....	.....	14
3·1	1·9	0·6	.....	0·28	8·0	0	0·5	0·05	.....	60·0	0	.....	4·4	2·5	51·7	64·1	.....	.....	.....	15
3·1	1·9	0·5	1·2	0·06	10·9	0	0·7	0	.....	54·9	0	7·8	7·2	4·4	49·4	66·0	.....	.....	.....	16
2·9	2·1	0·8	.....	0·13	9·5	0	0·5	0·08	.....	57·3	0	.....	6·6	3·1	50·1	66·0	8·2	.....	0·8	17
FROM FERRY AT ROSEDALE																				
2·9	1·8	0·9	0·75	0·08	15·7	0	Trace	0·10	.....	59·5 (61·0)	0 (0)	5·0	6·2	12·0	60·8	76·5	.....	.....	.....	18
4·9	2·8	1·0	2·2	0·06	17·4	0	0·4	0·10	.....	80·8	0	5·8	6·6	5·1	71·3	93·5	.....	.....	.....	19
4·0	3·6	1·2	8·8	0·23	10·7	0	0·5	0·10	.....	78·1	0	9·2	8·5	3·1	67·1	87·5	.....	.....	.....	20
2·8	2·6	1·0	.....	.....	7·6	0	.....	.....	0	65·4	0	.....	7·2	0	50·9	69·2	.....	.....	.....	21
2·3	1·4	0·7	4·6	0·31	6·4	0	0·4	0·05	.....	56·1	0	.....	6·0	2·2	48·2	55·2	.....	.....	.....	22
2·2	1·8	0·7	1·2	0·14	6·4	0	0·4	.....	.....	56·6	0	.....	5·2	4·9	51·3	61·5	.....	.....	.....	23

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet) On sampling date	Stream discharge* (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10⁶ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 3: FRASER RIVER																	
			Gauge height in feet															
1	Aug. 17*.....	111	9·32	9·79	65	.....	.....	7·4	15	40	.....	.....	109	.....	.....	.....	.....	15·9
							(2·0)	(8·0)	.....	(40)								
2	Aug. 25.....	71	8·58	9·79	63	.....	.....	7·7	10	50	.....	.....	111	.....	.....	.....	.....	16·7
3	Sept. 25.....	70	5·80	6·78	59	.....	.....	8·0	5	25	.....	.....	114	.....	.....	.....	.....	16·3
4	Oct. 23.....	91	4·62	5·35	45	.....	.....	7·8	5	20	20	19	123	78·4	0·107	.....	8·8	17·9
5	Nov. 25.....	65	3·56	5·16	32	.....	.....	7·5	15	15	.....	.....	116	.....	.....	.....	.....	17·5
6	Dec. 23/50...	46	4·70	4·51	41	.....	.....	7·6	15	15	.....	.....	108	.....	.....	.....	.....	15·8
7	Feb. 5/51....	8	2·44	2·74	34	.....	.....	7·5	5	0·2	.....	.....	138	.....	.....	.....	.....	22·0
8	Feb. 28.....	15	2·16	2·74	35	.....	.....	8·5	10	9	.....	.....	156	.....	.....	.....	.....	20·5
9	Mar. 24.....	114	2·06	1·93	38	.....	.....	7·9	10	560	341	319	180	114	0·155	.....	34·4	23·6
10	Yearly Average (12 samples)	55	7·01	7·25	46	.....	.....	7·8	13	100	.....	.....	125·5	86·0	0·117	.....	14·2	18·2

* Field sample, not included in average.

	STATION No. 4: FRASER RIVER FROM BRIDGE																	
11	Mar. 8/50*...	8	23,100	23,600	41	.....	.....	7·8	7	15	32	30	141	88·6	0·121	5·54	9·2	19·0
12	Mar. 23.....	3	23,900	23,600	39	.....	.....	8·2	5	15	91	39	156	96·2	0·131	6·20	10·0	20·4
13	Apr. 22.....	17	41,800	33,600	40	.....	.....	8·0	20	310	196	190	141	94·8	0·129	10·7	9·0	19·5
14	May 23.....	9	160,000	142,000	40	.....	.....	7·6	20	115	.....	.....	94·9	.....	.....	.....	.....	15·0
15	June 23.....	34	427,000	309,000	48	.....	.....	7·9	20	140	144	137	75·5	55·8	0·076	64·3	6·4	12·4
16	July 22.....	83	197,000	231,000	53	.....	.....	7·7	2	85	97	92	95·5	64·0	0·087	34·0	21·0	15·0
17	Aug. 10**....	118	121,000	115,000	63	.....	.....	8·0	8	45	.....	.....	103	.....	.....	.....	.....	16·0
							(1·5)	(8·0)	.....	(60)								
18	Aug. 18.....	62	105,000	115,000	55	.....	.....	7·5	7	30	.....	.....	98·5	.....	.....	.....	.....	15·0
19	Sept. 23.....	66	58,200	73,900	61	.....	.....	7·9	5	25	.....	.....	116	.....	.....	.....	.....	16·1
20	Oct. 23.....	91	48,500	55,300	46	.....	.....	7·8	5	25	24	23	113	74·8	0·102	9·79	10·6	16·2
21	Nov. 24.....	66	35,900	53,800	40	.....	.....	7·5	20	20	.....	.....	103	.....	.....	.....	.....	15·3
22	Dec. 22.....	47	48,100	45,300	42	.....	.....	7·5	20	20	.....	.....	102	.....	.....	.....	.....	15·3
23	Jan. 1951....	No sample taken		30,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
24	Feb. 24.....	12	25,500	32,900	36	.....	.....	7·1	5	6	3·0	2·7	138	93·6	0·127	6·44	14·8	20·0
25	Mar. 12.....	29	.....	.....	38	.....	.....	8·0	5	4	.....	.....	138	.....	.....	.....	.....	19·9
26	Yearly Average (12 samples)	43	106,445	95,458	45	.....	.....	7·7	11	66	.....	.....	114	79·9	0·109	.....	12·0	16·7

* Extra sample, not included in average; low water sample.

** Field sample, not included in average.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
FROM FERRY AT ROSEDALE—*Continued*																				
2·7	2·0	0·7	.....	.....	8·6	0	.....	.....	.....	59·5 (54·9)	0 (0)	.....	6·0	2·0 (7·0)	50·8 (52·0)	65·2	.....	.....	.....	1
2·7	1·8	0·6	.....	.....	8·8	0	.....	.....	0·01	57·8	0	.....	4·8	5·4	52·8	63·8	.....	.....	.....	2
3·1	1·8	0·6	.....	.....	8·0	0	.....	.....	.....	61·5	0	.....	5·5	3·1	53·5	65·5	.....	.....	.....	3
3·7	2·0	0·8	1·3	0·06	8·9	0	0·4	0·05	.....	65·9	0	.....	6·4	5·9	59·9	72·6	.....	.....	.....	4
3·8	2·2	0·9	.....	.....	10·1	0	.....	.....	0	75·6	0	.....	5·6	0	59·5	77·3	.....	.....	.....	5
3·2	1·7	0·4	.....	.....	9·5	0	.....	.....	.....	58·6	0	.....	5·1	4·5	52·5	64·5	.....	.....	.....	6
4·6	2·0	0·8	.....	.....	11·8	0	.....	.....	.....	83·0	0	.....	6·0	5·8	73·8	88·0	.....	.....	.....	7
4·6	2·1	0·7	.....	.....	14·4	0·6	.....	.....	.....	79·3	0	.....	7·2	5·1	70·1	89·1	.....	.....	.....	8
6·3	4·1	1·3	18·8	0·18	17·1	0·6	0·7	0	.....	90·0	0	.....	10·3	11·0	84·8	108	.....	.....	.....	9
3·6	2·3	0·8	.....	0·08	10·0	0·1	0·5	0·04	.....	69·0	0	.....	6·6	3·7	60·3	76·2	7·5	.....	0·6	10
AT HOPE—Drainage area, 85,600 square miles																				
4·6	2·6	0·8	1·5	0·11	14·0	0	0·5	0·10	.....	73·7	0	8·2	6·8	5·9	66·3	87·0	.....	.....	.....	11
5·1	3·1	0·8	2·4	0·04	18·9	0	0·4	0·10	.....	73·7	2·9	8·6	7·1	6·7	71·9	95·1	.....	.....	.....	12
3·8	3·7	1·3	11·1	0·21	11·0	0	0·4	0·10	.....	74·4	0	8·0	8·2	3·3	64·3	84·8	.....	.....	.....	13
2·7	2·0	0·8	.....	.....	8·1	0	.....	.....	.....	56·6	0	.....	6·4	2·1	48·5	62·8	.....	.....	.....	14
1·2	1·4	0·6	7·4	0·18	6·6	0	0·4	0·10	.....	41·5	.....	.....	5·1	1·8	35·8	48·3	.....	.....	.....	15
2·3	1·6	0·8	3·0	0·12	5·8	0	0·4	.....	.....	53·7	0	.....	5·6	2·9	46·9	58·0	.....	.....	.....	16
2·4	1·7	0·7	.....	.....	7·6	0 (0)	.....	.....	.....	53·7 (52·5)	0 (0)	.....	5·5	5·8 (8·0)	49·8 (51·0)	60·3	.....	.....	.....	17
2·3	1·5	0·6	.....	.....	8·0	0	.....	.....	0	51·0	0	.....	6·7	5·1	46·9	59·2	.....	.....	.....	18
3·3	2·0	0·7	.....	.....	10·5	0	.....	.....	.....	61·0	0	.....	5·2	3·8	53·8	67·8	.....	.....	.....	19
3·3	1·8	0·7	1·3	0·08	8·4	0	0·4	0	.....	61·0	0	.....	6·8	4·0	54·0	67·6	.....	.....	.....	20
3·1	2·0	0·8	.....	.....	7·0	0	.....	.....	0·01	63·4	0	.....	4·6	0	51·0	64·0	.....	.....	.....	21
2·9	1·7	0·3	.....	.....	8·7	0	.....	.....	.....	53·7	0	.....	5·2	6·0	50·0	60·5	.....	.....	.....	22
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23
4·0	2·3	0·8	0·59	0·05	9·9	1·5	0·7	0	0	70·8	0	.....	9·1	8·4	66·4	83·1	.....	.....	.....	24
4·2	2·0	1·0	.....	.....	6·2	1·0	1·3	.....	.....	75·2	0	.....	17·2	5·3	66·9	89·8	.....	.....	.....	25
3·2	2·1	0·8	.....	0·11	9·1	0·2	0·6	0·06	.....	61·3	0	.....	7·3	4·6	54·8	70·4	7·6	.....	0·7	26

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Tons per acre-foot	Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
														STATION No. 5: FRASER RIVER				
1	Aug. 10/50...	98	.....	.....	62	.....	..... (1·0)	8·0 (8·0)	5	45 (70)	56	53	105	67·0	0·091	.....	7·6	15·0
														STATION No. 6: FRASER				
2	Aug. 27/49...	75	.....	.....	61	.....	..... (2·0)	7·6 (8·3)	20	50 (20)	79	75	110	75·8	0·103	.....	15·2	17·2
														STATION No. 7: FRASER RIVER				
			Gauge height in feet															
3	Feb. 21/50*..	16	.....	.....	32	.....	.....	7·4	0	0·4	.....	.....	33·6	20·4	0·028	.....	1·0	4·9
4	Mar. 21.....	6	.....	.....	38	.....	.....	7·9	5	5	8·6	7·2	289	180	0·245	.....	16·8	36·7
5	Apr. 21.....	18	.....	.....	35·5	.....	.....	7·9	25	290	261	252	169	114	0·155	.....	10·4	22·9
6	May 23.....	7	19·26	18·23	47	.....	.....	8·1	40	165	.....	.....	123	.....	.....	.....	.....	18·0
7	June 21.....	36	31·52	26·52	56·5	.....	.....	8·1	15	335	376	358	108	74·0	0·099	.....	8·4	17·4
8	July 24.....	81	20·75	.....	62	.....	.....	7·7	10	145	131	124	109	67·6	0·092	.....	12·2	16·9
9	Aug. 18.....	110	14·94	.....	64	.....	..... (1·5)	7·8 (8·2)	3	50 (40)	.....	.....	124	.....	.....	.....	.....	18·8
10	Sept. 21.....	68	10·26	.....	59	.....	.....	8·0	5	35	.....	.....	126	.....	.....	.....	.....	18·1
11	Oct. 23.....	91	8·27	.....	40	.....	.....	7·8	15	10	22	21	134	85·4	0·116	.....	9·8	20·0
12	Nov. 21.....	69	4·35	.....	34	.....	.....	7·8	15	15	.....	.....	151	.....	.....	.....	.....	22·9
13	Dec. 23.....	46	.....	.....	33	.....	.....	7·7	15	20	.....	.....	158	.....	.....	.....	.....	22·5
14	Jan.	No sample taken.																
15	Feb. 21/51...	27	.....	.....	35	.....	.....	7·4	10	7	1·8	1·2	174	109	0·148	.....	12·8	24·4
16	Yearly Average (11 samples)	51	....	.....	46	.....	.....	7·8	15	100	.....	.....	151	.....	0·143	.....	.....	21·7
														STATION No. 8: FRASER RIVER AT				
17	Aug. 8/50...	113	.....	.....	64	.....	..... (1·5)	7·7 (8·1)	6 (25)	55 (40)	53	46	120	77·4	0·105	.....	5·8	19·2
														STATION No. 9: FRASER RIVER				
18	Aug. 21/50...	134	52,200†	61,100†	64	..... (9·2)	..... (1·2)	8·0 (8·0)	5	45 (30)	43	39	122	75·4	0·103	10·60	27·4	18·0

* Not included in average. Sampled through hole in ice with probable dilution with melted snow and ice.

† Records at Marguerite; maximum for year 192,000; minimum for year 23,600; average for year 87,200 second-feet.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
FROM BRIDGE AT SPUZZUM																				
2·7	1·6	0·5	2·9	0·10	8·2	0	0·4	0·05	.....	56·1	0	.....	5·7	2·5 (4·0)	48·5 (46·0)	61·8	6·5	.....	0·5	1
RIVER AT BOSTON BAR																				
3·0	1·8	1·0	1·3	0·13	11·2	0	0·5	0·05	.....	59·1 (61·0)	0 (0)	6·2	6·0	6·8 (1·3)	55·2 (51·3)	70·0	6·5	.....	0·95	2
FROM BRIDGE AT LILLOOET																				
0·9	0·5	0·1	.....	0·04	4·1	0	0	Trace	Trace	17·1	0	2·4	2·0	1·9	15·9	20·9	.....	.....	.....	3
13·0	5·6	1·2	0·57	0·10	37·0	0	2·7	0·05	.....	139	0	7·6	6·5	30·9	145	171	.....	.....	.....	4
5·0	4·3	1·2	14·4	0·20	10·5	0	0·4	0·1	.....	94·2	0	10·8	10·2	0·5	77·7	101	.....	.....	.....	5
3·6	1·8	0·9	.....	.....	8·4	0	.....	.....	0·03	66·9	2·4	.....	6·1	0·9	59·7	74·1	.....	.....	.....	6
3·2	1·4	0·9	21·0	0·21	9·2	0	0·4	0	.....	56·6	2·4	.....	5·2	6·2	56·6	68·1	.....	.....	.....	7
2·9	1·8	0·6	1·8	0·12	6·3	0	Trace	.....	.....	59·0	0	.....	5·1	5·7	54·1	62·7	.....	.....	.....	8
3·3	1·7	0·6	.....	.....	9·1	0 (0)	.....	.....	.....	67·3 (63·4)	0 (0)	.....	4·5	5·3	60·5	71·1	.....	.....	.....	9
3·9	2·0	0·5	.....	.....	11·9	0	.....	.....	0·005	70·5	0	.....	5·2	3·4	61·2	76·3	.....	.....	.....	10
4·4	2·0	0·6	1·2	0·04	9·4	0	0	0·1	.....	78·1	0	.....	6·4	4·0	68·0	81·3	.....	.....	.....	11
4·9	2·4	0·7	.....	.....	10·3	0	.....	.....	0·02	85·9	0	.....	5·6	7·1	77·5	88·5	.....	.....	.....	12
5·2	2·0	0·5	.....	.....	10·5	0	.....	.....	.....	88·1	0	.....	5·8	5·3	77·5	89·8	.....	.....	.....	13
																				14
6·3	2·6	0·6	0·52	0·08	14·0	0·5	0·7	0	.....	95·2	0	9·0	7·1	8·8	86·8	103	.....	.....	.....	15
5·1	2·5	0·75	.....	0·11	12·4	0	.....	.....	.....	82·8	0	.....	5·2	7·3	75·1	89·7	6·7	.....	0·4	16
BRIDGE NEAR WILLIAMS LAKE																				
3·1	1·1	0·6	2·0	0·07	8·9	0 (0)	0·4	0·05	.....	67·1 (63·4)	0 (0)	.....	5·1	5·7 (7·0)	60·7 (59·0)	71·5	3·7	.....	0·7	17
FROM FERRY AT MACALISTER																				
3·0	1·8	0·5	2·2	0·05	8·6	0	0·7	.....	.....	64·4 (59·8)	0 (0)	.....	5·2	4·4 (11·0)	57·2 (60·0)	69·5	6·3	.....	0·5	18

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet) On sampling date	Stream discharge* (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 10: FRASER RIVER AT BRIDGE																	
1	Mar. 19/50...	13	Ice conditions		33	.....	.....	7·9	2	5	15	12	153	90·4	0·123	.....	6·4	25·4
2	Apr. 19.....	15	5·48	5·90	44	.....	.....	8·1	15	155	214	201	154	102	0·139	.....	17·8	24·0
3	May 21.....	22	13·63	13·44	52	.....	.....	7·7	20	130	125	116	125	90·6	0·123	.....	39·4	18·9
4	June 19.....	51	21·20	17·78	64	.....	.....	7·7	5	180	237	231	115	83·6	0·114	.....	11·2	19·2
5	July 23.....	82	13·89	14·66	.....	.....	.....	7·8	5	75	98	93	112	71·2	0·097	.....	7·8	20·0
6	Aug. 22.....	115	9·19	10·24	66	.....	.....	7·6	7	50	.....	.....	120	.....	.....	.....	.....	17·7
							(2·0)	(8·2)	.....	(25)								
7	Sept. 5.....	84	9·84	8·03	58	.....	.....	7·8	10	135	.....	.....	125	.....	.....	.....	.....	20·2
8	Sept. 23.....	66	6·95	8·03	55	.....	.....	8·0	7	35	.....	.....	129	.....	.....	.....	.....	19·2
9	Oct. 28.....	97	6·34	6·80	39	.....	.....	7·9	15	15	27	24	137	96·6	0·131	.....	11·2	21·0
10	Nov.—Sample lost in transit.			6·44														
11	Dec. 21.....	43	5·69	5·69	36	.....	.....	7·5	10	15	.....	.....	142	.....	.....	.....	.....	23·3
12	Jan. 51—No sample taken; river frozen over.																	
13	Feb. 19.....	29	Ice conditions		34	.....	.....	7·5	15	5	7·6	6·2	163	102	0·139	.....	12·0	23·8
14	Average..... (11 samples)	56	10·2	10·1	48	.....	.....	7·8	20	70	.....	.....	134	90·9	0·124	.....	15·1	21·2
	STATION No. 11: FRASER RIVER BELOW MOUTH																	
15	Feb. 17/50...	15	Ice conditions		33	.....	.....	8·1	8	1	.....	.....	187	123	0·167	.....	13·0	29·4
16	Mar. 16.....	11	17·01	16·79	34	.....	.....	8·0	10	3	.....	.....	199	123	0·167	.....	8·2	30·0
17	Apr. 17.....	15	14·30	14·65	33	.....	.....	8·0	0	0·5	.....	.....	131	83·8	0·114	.....	5·4	19·8
18	May 16.....	14	25·70	22·79	44	.....	.....	7·4	40	45	.....	.....	108	.....	.....	.....	.....	17·0
19	June 18.....	39	31·79	27·93	51	.....	.....	7·8	25	170	152	143	115	72·2	0·098	.....	6·8	18·9
20	July 16.....	57	24·45	24·74	54	.....	.....	7·8	10	20	.....	.....	125	78·0	0·106	.....	7·0	19·4
21	Aug. 18.....	78	19·45	19·78	55	.....	.....	7·8	15	50	.....	.....	137	.....	.....	.....	.....	22·1
22	Average..... (7 samples)	33	22·1	21·1	43	.....	.....	7·8	15	75	.....	.....	143	96·0	0·130	.....	8·1	22·4

* Above inflow of Quesnel River.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
AT QUESNEL*—Drainage area, 38,000 square miles																				
3·9	1·6	0·2	0·40	0·04	15·2	0	0·7	0	.....	84·2	0	4·4	4·6	10·5	79·5	93·1	.....	.....	.....	1
5·0	2·0	0·9	30·0	0·25	11·9	0	0	0·30	.....	87·8	0	8·0	6·4	8·5	80·5	94·0	.....	.....	.....	2
2·9	1·6	0·8	1·3	0·35	3·5	0	0·9	0·20	0	68·6	0	6·6	3·9	2·9	59·1	70·8	.....	.....	.....	3
2·5	1·0	0·5	12·6	0·45	5·8	0	0·4	0	.....	63·4	0	.....	4·8	6·2	58·2	65·9	.....	.....	.....	4
2·8	1·6	0·5	1·6	0·09	7·1	0	0·4	.....	.....	62·2	0	.....	3·5	10·4	61·4	66·6	.....	.....	.....	5
3·1	1·5	0·5	.....	.....	8·8	0	.....	.....	.....	64·7 (63·4)	0 (0)	.....	4·1	4·0	57·0	68·0	.....	.....	.....	6
3·5	1·2	0·5	.....	.....	9·5	0	.....	.....	0·007	69·8	0	.....	4·6	7·6	64·8	74·5	.....	.....	.....	7
3·6	2·0	0·7	.....	.....	8·8	0	.....	.....	.....	73·2	0	.....	5·3	2·7	62·7	76·0	.....	.....	.....	8
4·5	2·2	0·3	1·1	0·07	9·1	0	0·5	0·10	.....	82·5	0	.....	10·1	3·4	71·0	88·5	.....	.....	.....	9
																				10
4·6	1·9	0·6	.....	.....	14·8	0	.....	.....	.....	81·5	0	.....	4·6	10·2	77·0	90·3	.....	.....	.....	11
																				12
5·3	2·1	0·5	0·79	0·10	12·5	1·0	0·7	0	.....	95·2	0	10·0	7·2	3·2	81·2	100	.....	.....	.....	13
3·8	1·7	0·6	.....	0·19	9·7	0	0·5	0·10	.....	75·7	0	.....	5·4	6·5	68·5	80·7	5·1	.....	0·5	14
OF NECHAKO RIVER AT PRINCE GEORGE																				
5·6	2·2	0·6	.....	0·10	12·4	0	0·3	0	0·08	104	2·4	6·0	6·2	7·6	96·4	110	.....	.....	.....	15
6·5	2·4	0·6	.....	0·32	17·3	0	0·5	0·05	.....	114	0	8·4	7·7	7·8	102	121	.....	.....	.....	16
3·1	2·7	0·3	.....	0·09	13·5	0	0·6	0·10	.....	66·6	0	7·8	5·9	7·6	62·2	78·8	.....	.....	.....	17
2·7	1·1	0·6	.....	.....	9·3	0	.....	.....	0·01	63·4	0	.....	4·4	1·5	53·5	66·3	.....	.....	.....	18
2·7	0·7	0·6	6·8	0·18	6·4	0	0·5	0	.....	64·9	0	.....	3·5	5·1	58·3	65·3	.....	.....	.....	19
3·7	1·4	0·7	1·5	0·41	9·9	0·5	1·3	0·05	.....	67·8	0	5·2	2·7	8·0	63·6	71·9	.....	.....	.....	20
3·4	1·0	0·3	.....	.....	9·1	0	.....	.....	0·02	73·0	0	.....	4·9	9·3	69·1	76·7	.....	.....	.....	21
4·0	1·6	0·5	.....	0·22	11·1	.....	.....	.....	.....	83·4	0·3	.....	5·0	4·0	72·3	84·3	4·5	.....	0·4	22

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 12: FRASER RIVER ABOVE																	
1	Feb. 17/50...	15	.....	.....	33	.....	.....	7·7	5	3	.....	.....	214	133	0·181	.....	13·4	35·8
2	Mar. 16.....	11	.....	.....	33	.....	.....	8·1	5	0·4	.....	.....	339	209	0·284	.....	15·4	46·1
3	Apr.—No sample taken.																	
4	May 16.....	14	78,000†	57,300†	44	.....	.....	7·5	45	45	.....	.....	109	.....	.....	.....	.....	17·4
5	June—No sample taken.		.....	92,400														
6	July 16.....	66	54,600	57,400	55	.....	.....	7·8	15	25	66	63	122	72·4	0·098	10·65	5·0	19·5
7	Aug.—No sample taken.		.....	31,300														
8	Sept. 2.....	131	29,800	21,300	55	.....	.....	7·9	15	50	.....	.....	138	.....	.....	.....	.....	21·4
9	Sept. 15.....	70	16,400	21,300	38	.....	(2·0)	(7·7)	10	(30) 25	.....	.....	153	.....	.....	.....	.....	24·0
10	Oct.—Sample lost in transit.			15,700														
11	Nov.—No sample taken.		.....	18,600														
12	Dec. 12.....	45	8,700	8,020	35	.....	.....	7·7	10	15	.....	.....	184	.....	.....	.....	.....	28·3
13	Jan. 9/51...	43	6,200	5,610	34	.....	.....	7·7	15	3	.....	.....	193	117	0·159	1·96	16·6	30·2
14	Feb. 10.....	38	4,900	4,820	38	.....	.....	7·8	7	0·9	.....	.....	213	127	0·173	1·68	9·2	33·8
15	Average..... (9 samples)	48	28,370	34,770	41	.....	.....	7·8	15	20	.....	.....	185	132	0·179	.....	11·9	28·5

† Discharge records at Shelley, drainage area 12,500 square miles; station established May 2, 1950.

	STATION No. 13: FRASER RIVER AT																	
16	Feb. 16/50*..	16	Low†	.....	33	.....	.....	8·2	5	4	.....	.....	195	.....	.....	.....	.....	.....
17	Mar. 16.....	.....	Low	.....	34	.....	.....	8·0	5	3	.....	.....	194	116	0·158	.....	7·0	26·0
18	Apr. 15.....	12	Low	.....	38	.....	.....	7·8	5	5	4·6	3·2	195	118	0·161	.....	10·4	28·0
19	May 16.....	27	Normal	.....	42	.....	.....	7·8	7	7	19	13	152	89·8	0·121	.....	33·6	20·0
20	June 15.....	27	High	.....	50	.....	.....	8·0	10	120	110	104	131	242	0·329	.....	39·6	34·2
21	July 15.....	58	High	.....	47	.....	.....	8·1	25	35	74	72	113	77·2	0·105	.....	5·2	17·0
22	Aug. 15.....	65	Normal	.....	52	.....	.....	8·1	10	70	.....	.....	112	.....	.....	.....	.....	17·8
23	Sept. 16.....	69	Normal	.....	51	.....	.....	8·0	15	40	.....	.....	121	.....	.....	.....	.....	18·3
24	Oct. 14.....	52	Low	.....	44	.....	.....	7·8	2	9	10·4	9·0	134	82·2	0·112	.....	16·4	17·6

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[c]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
MOUTH OF NECHAKO RIVER AT PRINCE GEORGE																				
6·5	2·2	0·7	.....	0·15	15·0	0	0·8	0	0·13	123	0	6·8	6·8	15·6	116	128	.....	.....	.....	1
15·5	5·1	2·3	.....	0·09	17·6	5·1	0·4	0	.....	193	4·8	16·6	14·9	8·8	179	209	.....	.....	.....	2
																				3
2·7	0·9	0·6	.....	.....	8·4	0	.....	.....	0·21	62·5	0	.....	4·3	3·3	54·5	65·0	.....	.....	.....	4
																				5
3·2	0·8	0·3	4·9	0·18	9·4	0	0·4	0	.....	65·9	0	.....	5·0	7·9	61·9	71·1	.....	.....	.....	6
																				7
4·6	1·1	0·8	.....	.....	9·1	0	0	.....	.....	75·6 (75·6)	0 (0)	.....	3·8	10·3	72·3	78·0	.....	.....	.....	8
4·1	1·4	0·4	.....	.....	10·1	0	.....	.....	.....	90·3	0	.....	5·0	2·8	76·8	89·4	.....	.....	.....	9
																				10
																				11
5·7	1·7	0·6	.....	.....	10·3	0	.....	.....	.....	104	0	.....	5·0	8·4	94·0	103	.....	.....	.....	12
5·6	1·8	0·4	.....	0·09	8·6	0	0	.....	.....	111	0	.....	1·9	7·2	98·4	103	.....	.....	.....	13
6·9	1·9	0·4	.....	0·09	13·0	0	1·1	0	.....	125	0	6·8	6·5	10·3	113	140	.....	.....	.....	14
6·1	1·9	0·7	.....	0·12	11·3	.....	0·45	0	.....	106	0·5	.....	5·9	9·3	96·2	110	4·1	.....	0·2	15
BRIDGE NEAR TÊTE JAUNE CACHE																				
.....	.....	.....	.....	.....	30·9	0	.....	.....	.....	97·4	2·4	.....	.....	17·6	101	.....	.....	.....	.....	16
8·0	2·0	0·9	.....	0·20	21·2	0	0·4	0	0	97·1	0	6·0	4·7	18·2	97·8	111	.....	.....	.....	17
7·3	2·0	1·2	0·47	0·06	30·8	0	0·4	0·10	.....	100	0	5·0	4·6	17·9	99·9	124	.....	.....	.....	18
5·2	1·2	0·9	0·30	0·07	15·8	0	0·8	0·05	0·03	73·2	0·	4·0	2·9	11·3	71·3	83·4	.....	.....	.....	19
5·9	1·1	1·1	10·4	0·08	12·5	0	0·7	0	.....	68·6	0	.....	3·2	53·4	110	92·4	.....	.....	.....	20
4·2	0·7	0·8	1·6	0·42	11·0	0	0·4	0	.....	55·4	0	8·0	2·4	14·3	59·7	64·1	.....	.....	.....	21
3·0	0·8	0·9	.....	.....	12·1	0	.....	.....	0·02	58·6	0	.....	3·6	8·7	56·7	67·0	.....	.....	.....	22
4·0	0·7	0·6	.....	.....	12·6	0	.....	.....	.....	65·9	0	.....	2·9	7·8	62·2	71·5	.....	.....	.....	23
4·5	0·8	0·6	0·68	0·04	15·0	0	0·4	0·16	.....	67·1	0	.....	2·9	7·4	62·4	74·9	.....	.....	.....	24

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet) On sampling date	Stream discharge* (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Tons per acre-foot	Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 13: FRASER RIVER AT																		
1	Nov. 14/50...	76	Low	.....	32	.....	.....	7·7	4	6	.....	.....	151	.....	.....	.....	.....	20·5
2	Dec. 14.....	50	Low	.....	33	.....	.....	7·6	5	8	.....	.....	163	.....	.....	.....	.....	21·3
3	Jan. 16/51...	28	Low	.....	32	.....	.....	7·7	7	1	.....	.....	176	111	0·151	.....	12·4	24·6
4	Average..... (11 samples)	43	.....	.....	41	.....	.....	7·9	10	30	.....	.....	149	120	0·163	.....	17·8	22·3
STATION No. 14: FRASER RIVER AT																		
5	Sept. 9/50...	122	.....	.....	50	.....	..... (1·3)	7·7 (7·8)	10 (8)	15 (20)	11	11	122	73·6	0·100	.....	5·2	16·2
STATION No. 15: YELLOWHEAD																		
6	Sept. 9/50...	130	.....	.....	52	.....	.....	7·5 (8·2)	15	6 (5)	63	42	139	84·0	0·114	.....	25·2	16·4
STATION No. 16: PITT RIVER																		
7	Aug. 16/50...	92	Gauge height in feet Max. 9·44 Min. 7·43	.....	65	..... (9·9)	..... (1·5)	7·1 (7·1)	10 (10)	7 (5)	11	9·2	24·3	18·2	0·025	.....	5·4	2·6
STATION No. 17: ALOUETTE RIVER																		
8	Aug. 17/50...	69	.....		483	65	.....	..... (1·5)	7·0 (7·2)	0 (5)	0·5	.....	.....	18·3	16·2	0·022	.....	5·2	3·2
STATION No. 18: STAVE RIVER																		
9	Aug. 23/49...	38	.....	.....	.....	62	.....	..... (2·0)	6·8 (6·8)	15 (5)	4 (<7)	2·4	1·2	15·2	22·8	0·031	.....	13·2	4·8
STATION No. 19: STAVE RIVER FROM																		
10	Aug. 17/50...	111	.....		3,160	62	.....	..... (2·0)	6·8 (6·7)	7 (5)	5	.....	.....	13·4	.....	.....	.....	.....	2·2

* Sample mostly lost in transit, and not included in average.

† No records available, river levels as reported by collector.

Maximum flow for year, 13,000; minimum 21; average, 948 second-feet.

Maximum flow for year, 25,000; minimum, 60; average, 4,290 second-feet.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
BRIDGE NEAR TÊTE JAUNE CACHE—*continued*																				
5·8	1·8	0·9	.....	.....	16·5	0	.....	.....	0	77·3	0	.....	4·6	11·6	75·0	88·1	.....	.....	.....	1
6·2	1·3	0·8	.....	.....	15·8	0	.....	.....	.....	81·0	0	.....	4·6	12·1	78·5	89·9	.....	.....	.....	2
6·6	1·5	0·9	.....	0·17	17·9	0	0·4	0·05	.....	93·2	0	6·2	5·1	12·1	88·5	103	.....	.....	.....	3
5·5	1·3	0·9	.....	0·15	16·5	0	0·5	0·04	.....	76·1	0	.....	3·8	15·9	78·3	88·1	3·4	.....	0·4	4
BRIDGE NEAR MOUNT ROBSON																				
4·9	1·5	0·4	0·70	0·03	12·2	0	0·4	0·05	.....	63·2 (58·6)	0 (0)	.....	4·2	8·8	60·6	70·9	5·1	.....	0·8	5
LAKE NEAR LUCERNE																				
7·9	0·9	0·3	0·41	0·02	16·5	0	0·7	0	.....	68·6 (65·9)	0 (0)	.....	2·7	17·3	73·5	79·1	2·6	.....	1·0	6
FROM BRIDGE NEAR MOUTH																				
0·2	0·6	0·3	0·68	0·10	3·6	0	0·5	0·05	.....	9·8 (7·3)	0 (0)	.....	3·0	0	7·3	25·7	14·5	.....	3·0	7
AT BRIDGE NEAR HANEY																				
0·1	0·6	0·1	0·10	.....	3·1	0	0	0	.....	8·5 (6·1)	0 (0)	3·4	3·7 (3·4)	1·4 (2·0)	8·4 (7·0)	15·0	13·3	.....	3·1	8
AT STAVE FALLS																				
0	0·9	0·2	0·11	0·03	10·0	0	0·35	0·10	.....	5·4 (6·1)	0 (0)	4·6	3·0	7·6	12·0	21·9	13·8	.....	3·3	9
HIGHWAY BRIDGE NEAR RUSKIN																				
0·1	0·5	0·2	.....	.....	2·5	0	.....	.....	.....	6·1	0	.....	2·7	0·9	5·9	11·2	15·0	.....	3·6	10

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 20: CANNELL																		
1	Aug. 23/49...	71	.....	.....	64	.....	..... (8·5)	7·1 (6·4)	10 (10)	0·4	.....	.....	27·7	20·6	0·028	.....	8·6	3·8
STATION No. 21: SUMAS																		
			Gauge height in feet Max.	Min.														
2	Aug. 10/50...	123	7·45	.....	.....	70	.....	..... (5·5)	7·4 (7·6)	20 (30)	12 (10)	23	17	168	111	0·151	.....	13·8	16·0
STATION No. 22: CHILLIWACK RIVER AT BRIDGE,																		
			Gauge height in feet.															
3	Aug. 25/49*...	69	.....	.....	54	.....	.....	7·2	5	3	.....	.....	69·8	51·2	0·069	.....	6·2	12·0
4	Feb. 1/50*....	27	6·10	6·66	32	.....	(1·5)	(7·9) 7·7	(5) 5	..... 0·4	.....	.....	96·6	63·6	0·087	.....	8·6	15·0
5	Feb. 25.....	12	7·40	6·66	42	.....	.....	7·9	5	15	52	48	101	59·4	0·081	.....	8·2	14·2
6	Mar. 26.....	22	7·10	7·62	42	.....	.....	7·7	5	6	13·0	12·6	89·7	58·6	0·080	.....	3·8	14·8
7	Apr. 25.....	14	7·60	7·34	42	.....	.....	7·8	10	7	18	15	81·3	55·0	0·075	.....	5·0	13·0
8	May 26.....	6	9·55	8·82	44	.....	.....	7·5	15	105	.....	.....	56·3	.....	.....	.....	.....	12·3
9	June 26.....	44	9·50	10·84	48	.....	.....	7·3	15	15	37	35	48·7	37·0	0·050	.....	10·0	7·5
10	Aug. 10.....	118	7·45	7·57	62	.....	.....	7·7	5	7	.....	.....	77·0	.....	.....	.....	.....	12·4
11	Aug. 15*.....	81	8·75	7·57	54	.....	(3·0)	(7·85) 7·4	(5) 15	(5) 105	141	135	54·2	39·2	0·053	.....	9·4	8·1
12	Sept. 1.....	95	6·75	6·35	56	.....	.....	7·4	0	4	.....	.....	61·1	.....	.....	.....	.....	9·8
13	Sept. 13*.....	168	6·20	6·35	55	.....	.....	7·6	7	1	.....	.....	67·2	.....	.....	.....	.....	10·5
14	Sept. 25.....	70	6·65	6·35	52	.....	.....	7·6	3	5	.....	.....	67·9	.....	.....	.....	.....	10·6
15	Oct. 25.....	89	8·20	7·67	48	.....	.....	7·7	15	50	93	89	65·3	47·2	0·064	.....	6·0	10·4
16	Nov. 25.....	65	8·70	8·05	44	.....	.....	7·4	15	45	.....	.....	75·2	.....	.....	.....	.....	13·4
17	Dec. 12*.....	52	9·90	9·00	43	.....	.....	7·8	10	45	.....	.....	63·6	.....	.....	.....	.....	9·3
18	Dec. 26.....	43	10·45	9·00	43	.....	.....	7·4	15	35	.....	.....	65·2	.....	.....	.....	.....	10·3
19	Jan. 25/51....	19	8·05	7·13	38	.....	.....	7·4	10	25	49	46	83·5	57·4	0·078	.....	9·2	13·8
20	Average..... (12 samples)	49·8	8·1	7·8	46·8	.....	.....	7·6	9	27	.....	.....	72·7	52·4	0·071	.....	7·0	11·9

* Not included in average.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
LAKE NEAR MISSION CITY																				
0·4	1·1	0·1	.....	0·05	6·6	0 (0)	0	0	.....	9·4 (11·0)	0 (0)	3·4	4·2	3·4	11·2	20·9	17·5	.....	2·9	1
RIVER NEAR KILGARD																				
6·2	6·7	1·2	2·3	0·26	7·6	8·0	3·5	0·10	0·01	75·6 (79·3)	0 (0)	.....	21·0	3·4	65·4	108	17·8	.....	1·0	2
VEDDER CROSSING—Drainage area, 450 square miles																				
0·9	1·6	0·5	.....	0·15	11·5	0	0·4	0	.....	25·4 (34·2)	0 (0)	4·4	7·2	12·8	33·6	46·8	.....	.....	.....	3
2·4	1·8	0·3	.....	0·05	10·5	0	0·6	0	.....	45·4	0	5·6	7·3	10·1	47·3	.....	.....	.....	.....	4
1·3	0·8	0·3	2·6	0·06	13·8	0	0·7	.....	.....	45·9	0	5·8	6·6	3·1	40·7	.....	.....	.....	.....	5
1·3	1·4	0·6	1·1	0·03	13·5	0	0·4	0·05	.....	45·9	0	6·2	6·6	4·6	42·2	.....	.....	.....	.....	6
0·8	1·7	0·6	1·0	0·04	11·0	0	0·5	0·05	.....	39·5	0	6·2	6·2	3·3	35·7	.....	.....	.....	.....	7
0·8	0·9	0·5	.....	.....	12·8	0	.....	.....	.....	29·0	0	.....	5·0	10·2	34·0	.....	.....	.....	.....	8
0·6	0·8	0·4	1·8	0·12	4·1	0	0·4	0	.....	19·5	0	.....	5·0	5·2	21·2	.....	.....	.....	.....	9
1·0	1·4	0·4	.....	.....	7·8	0 (0)	.....	.....	.....	36·6 (36·6)	0 (0)	.....	6·2	5·0	35·0	.....	.....	.....	.....	10
0·8	0·9	0·4	0·58	0·05	3·1	0	0·6	.....	.....	29·3	0	.....	4·3	0	23·5	.....	.....	.....	.....	11
0·7	0·9	0·4	.....	.....	6·6	0	.....	.....	0	28·1	0	.....	6·1	4·4	27·4	.....	.....	.....	.....	12
1·1	1·4	0·6	.....	.....	8·0	0	.....	.....	.....	34·2	0	.....	7·8	2·5	30·5	.....	.....	.....	.....	13
0·9	1·1	0·4	.....	.....	4·9	0	.....	.....	.....	35·4	0	.....	5·7	1·1	30·1	.....	.....	.....	.....	14
1·1	1·5	0·5	5·0	0·12	5·8	0	0·4	0·10	.....	34·4	0	.....	4·0	2·3	30·5	.....	.....	.....	.....	15
1·1	2·2	1·4	.....	.....	4·5	0	.....	.....	0·01	48·8	0	.....	5·0	0	38·0	.....	.....	.....	.....	16
1·1	0·9	0·6	.....	.....	6·8	0	.....	.....	.....	31·7	0	.....	5·0	1·5	27·5	.....	.....	.....	.....	17
1·0	1·7	0·9	.....	.....	5·5	0	.....	.....	.....	35·6	0	.....	5·9	0·8	30·0	.....	.....	.....	.....	18
1·4	0·9	0·2	2·5	0·10	4·9	0	0·5	.....	.....	42·0	0	5·4	5·0	5·8	40·2	.....	.....	.....	.....	19
1·0	1·3	0·5	.....	0·08	7·9	0	0·8	0·06	0·01	36·7	0	.....	5·6	3·8	33·8	47·2	7·5	.....	1·2	20

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet)		Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter		Specific conductance $K \times 10^6$ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids)			Loss on ignition at 550°C.	Calcium (Ca)
			On sampling date	Monthly mean							Dried at 105°C.	Ignited at 550°C.		P.P.M.	Tons per acre-foot	Thousand tons per day		
	STATION No. 23: CULTUS																	
1	Aug. 10/50....	118	.....	.....	73	.....	..... (2·0)	8·0 (8·1)	5 (5)	3	.....	.....	166	104	0·142	.....	7·2	29·8
	STATION No. 24: ELK																	
2	Aug. 25/49....	34	.....	.....	52	.....	..... (1·2)	8·1 (8·4)	3 (5)	0·3	.....	.....	238	154	0·209	.....	24·6	41·3
	STATION No. 25: HARRISON RIVER																	
			Gauge height in feet															
3	Aug. 26/49*...	76	.....	.....	59	.....	..... (1·5)	7·5 (7·7)	5 (5)	5 (7)	3·8	3·2	47·2	36·0	0·049	.....	7·8	7·6
4	Feb. 7/50....	25	4·53	4·78	37	.....	.....	7·5	5	2	.....	.....	46·8	38·4	0·052	.....	7·8	7·0
5	Mar. 6**.....	10	5·85	4·13	40	.....	.....	7·3	0	4	5·0	3·2	48·8	34·0	0·046	.....	5·6	7·0
6	Apr. 3.....	14	3·50	4·57	42	.....	.....	7·6	0	0·5	.....	.....	49·1	33·0	0·045	.....	4·0	7·2
7	May 4.....	11	7·70	11·89	45	.....	.....	7·7	0	2	.....	.....	49·4	35·4	0·048	.....	7·6	7·0
8	June 5.....	31	15·16	18·94	51	.....	.....	7·4	3	0·4	.....	.....	49·4	.....	.....	.....	.....	6·8
9	July 3.....	37	19·48	16·64	51	.....	.....	7·3	5	3	.....	.....	50·8	38·0	0·052	.....	6·8	7·4
10	Aug. 1.....	79	13·65	11·03	58	.....	.....	7·4	6	9	.....	.....	45·1	.....	.....	.....	.....	7·2
11	Aug. 17*.....	111	10·65	11·03	63	.....	..... (1·3)	7·0 (7·5)	7 (5)	6 (5)	.....	.....	44·6	.....	.....	.....	.....	6·7
12	Sept. 5.....	40	9·35	8·01	60	.....	.....	7·2	2	5	.....	.....	43·8	.....	.....	.....	.....	7·2
13	Oct. 3.....	63	6·74	7·24	55	.....	.....	7·9	10	1	.....	.....	43·1	30·8	0·042	.....	5·0	6·7
14	Nov. 6.....	66	7·53	7·06	48	.....	.....	7·8	5	2	.....	.....	75·4	.....	.....	.....	.....	10·5
15	Dec. 3.....	61	6·97	7·62	45	.....	.....	7·2	5	3	.....	.....	45·1	.....	.....	.....	.....	6·2
16	Jan. 3.....	40	7·21	5·34	44	.....	.....	7·2	5	5	4·9	3·6	45·4	33·8	0·046	.....	9·0	6·2
17	Average..... (12 samples)	43·5	8·97	8·93	48	.....	.....	7·4	4	3	.....	.....	49·3	20·2	0·027	.....	6·5	7·2
	STATION No. 26: COQUIHALLA																	
18	Aug. 10/50....	132	.....	.....	57	.....	..... (1·5)	7·4 (7·8)	3 (5)	1 (clear)	.....	.....	77·7	55·8	0·076	.....	12·0	13·4

* Not included in average.

** Heavy rains caused flood run-off from Chehalis River which enters above the sampling point.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
LAKE AT CULTUS LAKE																				
2·3	3·2	0·5	.....	0·1	21·6	0 (0)	1·2	0	.....	73·2 (73·2)	1·2 (0)	8·0	6·2	21·9	83·9	102	7·8	.....	0·15	1
RIVER NEAR CHILLIWACK																				
3·0	3·3	0·4	.....	0·04	39·5	1·6	1·2	0·05	.....	90·3 (95·2)	2·4 (0)	.....	10·9	37·3	115	148	5·8	0·1	.....	2
AT RAILWAY BRIDGE, HARRISON MILLS																				
0·5	1·3	0·6	0·06	0·02	7·9	0 (0)	0	.....	.....	19·9 (17·1)	0 (0)	6·4	6·4	4·8	21·1	.....	.....	.....	.....	3
0·5	1·4	0·7	.....	0·06	6·3	0	0	0·05	0·02	21·5	0	4·6	5·8	8·1	19·6	.....	.....	.....	.....	4
0·9	1·3	0·6	0·32	0·06	9·4	0	0	0·05	.....	20·7	0	5·8	5·0	4·2	21·2	.....	.....	.....	.....	5
0·5	1·3	0·6	.....	0·06	10·7	0	0	0·05	.....	21·0	0	3·8	4·9	2·9	20·1	.....	.....	.....	.....	6
0·3	1·5	1·0	.....	0·03	6·2	0	0·4	0·10	0	24·6	0	4·0	4·8	0	18·7	.....	.....	.....	.....	7
0·3	1·6	0·9	.....	.....	6·4	0	.....	.....	.....	21·7	0	.....	5·0	0·4	18·2	.....	.....	.....	.....	8
1·2	1·3	0·6	.....	0·13	6·1	0·6	0·4	0·05	.....	23·7	0	5·6	5·2	4·0	23·4	.....	.....	.....	.....	9
0·3	1·4	0·6	.....	.....	8·4	0	.....	.....	0	20·0	0	.....	5·7	2·8	19·2	.....	.....	.....	.....	10
0·6	1·4	0·6	.....	.....	5·8	0	.....	.....	.....	19·5 (17·1)	0 (0)	.....	5·0	3·2	19·2	.....	.....	.....	.....	11
0·3	1·1	0·6	.....	.....	5·6	0	.....	.....	0	19·5	0	.....	5·7	3·2	19·2	.....	.....	.....	.....	12
0·5	1·2	0·7	.....	0·07	6·7	0·5	0·4	0	.....	19·5	0	.....	4·7	2·8	18·8	.....	.....	.....	.....	13
1·6	1·7	0·8	.....	.....	8·2	0	0	.....	0·01	22·0	0	.....	5·6	3·6	21·6	.....	.....	.....	.....	14
0·9	1·7	0·7	.....	.....	6·2	0	.....	.....	.....	22·0	0	.....	5·2	1·0	19·0	.....	.....	.....	.....	15
0·8	1·8	0·6	0·4	0·05	7·9	0	0	0·10	.....	20·5	0	.....	5·0	2·0	18·8	.....	.....	.....	.....	16
0·7	1·4	0·7	.....	0·07	7·3	0	0·1	0·06	.....	21·4	0	.....	5·2	3·3	20·8	33·3	12·3	.....	1·8	17
RIVER NEAR HOPE																				
1·2	1·7	0·6	.....	0·10	8·2	0	0	0·05	.....	41·5 (36·6)	0 (0)	10·2	8·0	4·3	38·3	53·6	8·4	.....	1·3	18

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10⁶ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 27: SCHKAM																		
1	Aug. 17/50....	69	.....	.....	67·5	.....	..... (3·0)	7·2 (7·4)	3 (<5)	0	.....	.....	67·5	42·6	0·058	.....	5·4	8·6
STATION No. 28: LYTTON																		
2	Aug. 18/50....	68	.....	.....	60	.....	..... (3·0)	7·6 (7·8)	2 (<5)	0·2	.....	.....	132	87·6	.....	.....	5·4	22·3
STATION No. 29: THOMPSON RIVER AT																		
			Gauge height in feet															
3	Aug. 27/49*...	75	.....	.....	64	.....	..... (1·5)	7·5 (8·2)	5 (5)	4	8·6	7·2	86·3	56·8	0·077	.....	22·8	11·4
4	Mar. 1/50....	8	9,230	9,380	35	.....	.....	7·8	0	0·5	.....	.....	147	95·6	0·130	2·460	8·8	19·2
5	Mar. 28.....	8	8,510	9,380	40	.....	.....	8·1	0	0·3	.....	.....	130	78·0	0·106	1·779	10·0	16·6
6	Apr. 29.....	16	11,700	9,620	48	.....	.....	7·9	10	2	.....	.....	134	87·2	1·185	2·751	10·4	18·0
7	May 31.....	36	48,300	30,300	55	.....	.....	7·8	7	15	.....	.....	114	.....	.....	.....	.....	15·6
8	June—No sample taken.		.....	84,300														
9	July 4.....	36	91,600	68,400	62	.....	.....	7·5	7	15	28	27	85·3	59·0	0·080	1·456	9·6	12·1
10	Aug. 1.....	95	46,900	31,300	63	.....	.....	7·9	10	8	.....	.....	85·8	.....	.....	.....	.....	13·0
11	Aug. 9*.....	83	35,200	31,300	64	.....	..... (1·5)	7·9 (7·9)	5 (5)	3 (5)	.....	.....	93·8	.....	.....	.....	.....	11·8
12	Sept. 6.....	83	20,900	18,300	65	.....	.....	7·6	2	5	.....	.....	88·3	.....	.....	.....	.....	12·5
13	Oct. 4.....	54	14,800	14,600	58	.....	.....	8·0	10	10	2·5	1·3	95·3	64·2	0·087	2·564	7·8	13·6
14	Oct. 31.....	94	13,200	14,600	48	.....	.....	7·4	8	1	.....	.....	104	74·4	0·101	2·650	9·0	15·0
15	Nov.—No sample taken.		.....	12,900														
16	Dec. 1.....	69	12,400	11,600	37	.....	.....	7·8	5	0·5	.....	.....	102	.....	.....	.....	.....	14·2
17	Jan. 6/51....	38	10,400	9,330	35	.....	.....	7·7	10	0·8	.....	.....	83·4	.....	.....	.....	.....	14·6
18	Average..... (11 samples)	49	26,175	56,800	49	.....	.....	7·1	6	5	.....	.....	106·2	76·4	0·104	.....	9·3	14·9

* Not included in average.

STATION No. 30: THOMPSON

19	Aug. 8/50....	84	35,800†	31,300†	62	.....	..... (2·0)	7·8 (8·0)	8 (6)	6 (5)	.....	.....	86·5	.....	.....	.....	.....	11·5

† Records at Spences Bridge—*see* Station No. 29.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
CREEK AT HOPE																				
1·7	1·2	0·8	.....	0·05	4·6	0 (0)	0·4	0	.....	37·3 (35·4)	0 (0)	5·4	7·0	0 (0)	28·5 (29·0)	42·7	8·1	.....	1·8	1
CREEK AT LYTTON																				
1·6	2·6	0·2	.....	0·03	5·3	0 (0)	0	0	.....	79·3 (78·1)	0 (0)	12	14	0 (1·0)	62·2 (65·0)	84·9	8·3	.....	0·7	2
BRIDGE AT SPENCES BRIDGE—Drainage area, 21,500 square miles																				
1·8	1·4	0·9	0·34	0·02	6·8	0	0	0·05	.....	40·5	0	3·6	4·4	2·6	35·8	.....	.....	.....	.....	3
4·0	4·8	1·0	.....	.....	17·3	0	1·0	0·10	0·10	71·7	0	8·6	7·3	5·6	64·4	.....	.....	.....	.....	4
4·0	3·1	1·0	.....	0·02	20·9	0	0·4	0·05	.....	54·7	3·4	6·4	7·0	7·5	57·9	.....	.....	.....	.....	5
3·1	4·1	1·4	.....	0·06	21·3	0	0·5	0·15	.....	63·4	0	7·6	7·4	1·7	57·7	.....	.....	.....	.....	6
2·7	3·2	1·2	.....	.....	8·8	0	.....	.....	0·04	61·2	0	.....	9·2	0	50·0	.....	.....	.....	.....	7
																				8
2·1	1·8	0·8	2·0	0·08	6·4	1·1	0	0·05	.....	47·3	0	.....	5·6	0	38·8	.....	.....	.....	.....	9
1·7	2·6	0·9	.....	.....	6·6	0	.....	.....	0·01	43·9	0	.....	9·3	3·4	39·4	.....	.....	.....	.....	10
1·7	1·8	0·8	.....	.....	7·0	0	.....	.....	.....	43·9	0	.....	5·0	0·4	36·4	.....	.....	.....	.....	11
2·0	1·9	0·9	.....	.....	8·6	0	.....	.....	0	45·4	0	.....	5·8	2·2	39·4	.....	.....	.....	.....	12
2·2	2·2	0·9	0·3	0·02	9·4	0	0·4	0·05	.....	48·8	0	.....	8·0	3·0	43·0	.....	.....	.....	.....	13
2·6	2·7	1·0	.....	0·20	11·0	0	0·7	0·10	.....	51·7	0	.....	7·0	5·6	48·0	.....	.....	.....	.....	14
																				15
2·5	2·2	0·8	.....	.....	8·3	0	.....	.....	0·05	53·7	0	.....	6·8	1·5	45·5	.....	.....	.....	.....	16
2·9	1·8	0·8	.....	.....	12·2	0	.....	.....	.....	54·2	0	.....	4·8	4·0	48·4	.....	.....	.....	.....	17
2·7	2·8	1·1	.....	0·07	11·9	.....	0·6	0·08	0·05	54·2	.....	.....	7·1	3·9	48·3	68·0	10·9	.....	1·4	18
RIVER AT ASHCROFT																				
1·6	1·8	0·8	.....	.....	5·8	0	.....	.....	.....	41·7	0	.....	4·2	1·1 (5·0)	35·3 (37·0)	46·2	9·7	.....	0·9	16

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet)		Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter		Specific conductance $K \times 10^6$ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids)			Loss on ignition at 550°C.	Calcium (Ca)
			On sampling date	Monthly mean							Dried at 105°C.	Ignited at 550°C.		P.P.M.	Tons per acre-foot	Thousand tons per day		
STATION No. 31: THOMPSON RIVER AT																		
			Gauge height in feet															
1	Aug. 27/49....	13	.....	.....	64	.....	.....	7·4	5	6	.....	.....	80·8	.....	.....	.....	.....	11·0
							(1·5)	(8·1)	(8)	(7)								
2	Aug. 8/50....	120	6·15†	5·74†	61	.....	.....	7·6	6	3	.....	.....	80·0	.....	.....	.....	.....	11·6
							(2·0)	(7·8)	(7)	(5)								
STATION No. 32: THOMPSON* RIVER																		
3	Feb. 1-10/50.	32	2·74		33	.....	.....	7·5	5	1	.....	.....	19·1	122	0·166	.....	7·2	12·9
4	Feb. 11-20....	29	2·55	2·60	34	.....	.....	7·7	0	0·5	.....	.....	99·6	64·0	0·087	.....	8·2	13·2
5	Feb. 21-28....	20	2·50		33	.....	.....	7·5	0	0·5	.....	.....	101	65·2	0·089	.....	9·4	13·0
6	Mar. 1-10....	31	2·00		34	.....	.....	7·6	0	0·3	.....	.....	109	66·2	0·090	.....	11·6	13·5
7	Mar. 11-20....	33	0·54	0·86	34	.....	.....	7·4	0	0·3	.....	.....	103	66·2	0·090	.....	6·0	14·2
8	Mar. 21-31....	32	0·14		40	.....	.....	7·6	2	2	.....	.....	101	82·6	0·112	.....	17·4	14·6
9	Apr. 1-10....	22	0·12		42	.....	.....	7·6	3	3	.....	.....	98·6	73·0	0·099	.....	11·4	14·6
10	Apr. 11-20....	30	0·41	0·46	44	.....	.....	7·9	0	1	.....	.....	107	69·2	0·094	.....	10·6	13·8
11	Apr. 21-30....	20	0·86		44	.....	.....	7·6	8	0·7	.....	.....	101	70·4	0·096	.....	6·6	13·0
12	May 1-10....	32	1·86		48	.....	.....	7·8	5	0·3	.....	.....	95·5	66·8	0·091	.....	8·2	13·4
13	May 11-20....	36	5·27	4·64	52	.....	.....	7·5	5	0·4	.....	.....	93·6	65·4	0·089	.....	6·0	14·4
14	May 21-31....	25	6·59		48	.....	.....	7·4	0	0·4	.....	.....	90·1	66·0	0·090	.....	7·2	12·1
15	June 1-10....	37	8·32		50	.....	.....	7·5	2	4	7·0	3·4	90·1	113	0·154	.....	44·6	12·8
16	June 11-20....	19	13·42	12·51	54	.....	.....	7·4	8	0·3	.....	.....	92·7	66·2	0·090	.....	14·0	12·8
17	June 21-30....	6	15·78		57	.....	.....	7·4	3	0·5	.....	.....	82·0	64·6	0·088	.....	11·6	13·2
18	July 1-10....	71	13·44		59	.....	.....	7·4	5	0·4	.....	.....	83·8	62·8	0·085	.....	10·6	13·6
19	July 11-20....	71	10·66	10·52	58	.....	.....	7·6	5	3	.....	.....	82·0	69·8	0·095	.....	11·8	12·2
20	July 21-31....	101	8·70		60	.....	.....	7·4	5	1	.....	.....	93·1	61·4	0·084	.....	9·0	11·0

† Records at Kamloops, B.C.—*see* Station No. 33.

* Due to sample location being on left side of bridge, water is probably usually from the South Thompson River.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
HIGHWAY BRIDGE NEAR SAVONA—Drainage area at Walhachin, 15,600 square miles																				
1·4	1·6	0·9	.....	.....	4·9	0	.....	.....	.....	39·0 (41·5)	0 (0)	.....	5·2	1·3	33·3	44·2	9·2	.....	1·5	1
1·4	1·2	0·8	.....	.....	6·8	0	.....	.....	.....	38·1 (34·2)	0 (0)	.....	5·4	3·5	34·7	46·0	6·8	.....	1·2	2
AT BRIDGE BELOW KAMLOOPS—Drainage area, 14,400 square miles																				
2·6	18·8	1·2	.....	0·27	11·4	25·8	0·4	0·10	0	51·0	0	12·4	9·9	1·1	42·9	.....	.....	.....	.....	3
2·3	2·4	1·0	.....	0·02	13·0	0	0·6	0·10	.....	46·6	0	7·4	6·2	4·3	42·5	.....	.....	.....	.....	4
2·5	2·0	0·9	.....	0·04	12·8	0	0·4	0·10	.....	45·9	0	7·2	6·3	5·1	42·7	.....	.....	.....	.....	5
2·5	2·4	0·9	.....	0·03	16·0	0	0·4	0·10	.....	46·6	0	7·6	7·3	5·6	44·0	.....	.....	.....	.....	6
2·5	2·3	0·9	.....	0·03	17·3	0	0·7	0·10	0	47·3	0	5·6	6·8	6·9	45·7	.....	.....	.....	.....	7
2·7	2·4	1·0	.....	0·07	14·0	0	0·6	0·15	.....	48·8	0	8·2	7·6	7·5	47·5	.....	.....	.....	.....	8
2 0	2·4	1·0	.....	0·17	18·0	0	0·8	0·10	0·01	47·6	0	9·4	7·0	9·7	48·7	.....	.....	.....	.....	9
2·3	3·2	0·9	.....	0·05	12·8	0	0·8	0·10	.....	50·0	0	6·4	6·8	2·9	43·9	.....	.....	.....	.....	10
2·2	2·4	1·1	.....	0·06	7·4	0	0·7	0·10	.....	46·4	0	6·4	6·7	3·5	41·5	.....	.....	.....	.....	11
1·9	2·1	0·9	.....	0·12	9·5	0	1·3	0·10	.....	45·9	0	7·8	7·0	3·6	41·2	.....	.....	.....	.....	12
2·1	1·8	1·0	.....	0·22	7·1	0	0·9	0·10	.....	47·8	0	11·0	7·3	5·4	44·6	.....	.....	.....	.....	13
1·9	1·6	0·9	.....	0·17	8·1	0	0·8	0·10	.....	44·9	0	11·4	5·6	1·2	38·0	.....	.....	.....	.....	14
1·8	2·0	1·0	0·8	0·12	8·9	0	0·5	0·05	0	42·2	0	.....	6·4	4·7	39·3	.....	.....	.....	.....	15
1·9	1·8	0·9	.....	0·13	8·4	0	1·2	0·08	.....	43·9	0	.....	9·4	3·7	39·7	.....	.....	.....	.....	16
1·7	2·0	0·9	.....	0·25	10·4	0	1·3	0·08	.....	41·5	0	.....	8·6	5·9	39·9	.....	.....	.....	.....	17
1·5	1·8	0·9	.....	0·16	8·6	0	0·5	0·10	.....	42·7	0	.....	8·8	5·1	40·1	.....	.....	.....	.....	18
1·7	1·8	0·8	.....	0·19	6·4	0	0·9	0·10	.....	42·0	0	.....	10·0	3·0	37·4	.....	.....	.....	.....	19
1·5	1·8	0·9	.....	0·17	4·9	0	0·8	.....	.....	43·9	0	.....	7·2	0	33·6	.....	.....	.....	.....	20

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet): On sampling date	Stream discharge* (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids): Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
			Gauge height in feet															
													STATION No. 32—THOMPSON RIVER AT					
1	Aug. 1–10....	90	6·80		63	.....	.....	7·5	3	3	.....	.....	79·8	60·8	0·083	.....	11·8	10·7
2	Aug. 8/50*...	120	6·15		61	.....	.....	7·6	6	3	.....	.....	80·0	.....	.....	.....	.....	11·6
3	Aug. 8/50**..	84	6·15	5·74	61	.....	(2·0)	(7·8) 7·6	(7) 10	(5) 15	.....	.....	88·3	.....	.....	.....	.....	12·5
4	Aug. 11–20....	92	5·47		64	.....	(1·1)	(7·7) 7·4	(8) 0	(15) 5	.....	.....	78·6	56·2	0·076	.....	8·8	11·4
5	Aug. 21–31....	93	5·03		63	.....	.....	7·6	10	3	.....	.....	79·0	60·0	0·082	.....	7·4	11·7
6	Sept. 1–10....	97	4·21		63	.....	.....	7·2	4	5	7·4	3·2	80·8	55·0	0·075	.....	8·0	11·0
7	Sept. 11–20....	81	3·05	3·34	64	.....	.....	7·9	10	0·8	.....	.....	77·3	56·6	0·077	.....	9·6	11·4
8	Sept. 21–30....	63	2·75		61	.....	.....	7·6	0	3	.....	.....	80·1	59·4	0·081	.....	8·8	11·7
9	Oct. 1–10....	67	2·11		54	.....	.....	7·2	1	5	9·8	5·6	83·8	57·4	0·078	.....	8·8	12·0
10	Oct. 11–20....	110	2·74	2·24	52	.....	.....	7·5	7	0·4	.....	.....	82·8	63·2	0·086	.....	9·0	12·1
11	Oct. 21–31....	100	1·90		48	.....	.....	7·3	5	0·6	.....	.....	86·2	58·4	0·079	.....	10·8	11·8
12	Nov. 1–10....	109	2·04		44	.....	.....	7·4	5	0·7	.....	.....	84·3	60·8	0·083	.....	12·8	13·0
13	Nov. 11–20....	89	1·72	1·68	39	.....	.....	7·6	5	0·5	.....	.....	82·9	59·6	0·081	.....	6·8	12·4
14	Nov. 21–30....	73	1·29		38	.....	.....	7·3	5	3	.....	.....	86·6	63·0	0·086	.....	11·0	12·5
15	Dec. 1–10....	53	1·35		36	.....	.....	7·2	7	3	.....	.....	92·3	62·0	0·084	.....	13·8	12·7
16	Dec. 11–20....	59	1·11	1·15	37	.....	.....	7·0	3	1	.....	.....	90·8	60·8	0·083	.....	13·2	12·5
17	Dec. 21–31....	59	0·99		38	.....	.....	7·8	6	0·6	.....	.....	69·4	63·6	0·087	.....	9·0	13·9
18	Jan. 1–10/51.	52	0·99		36	.....	.....	7·3	5	0·5	.....	.....	95·8	66·4	0·090	.....	11·4	13·1
19	Jan. 11–20....	42	0·85	0·96	33·5	.....	.....	7·2	5	0·5	.....	.....	99·2	69·4	0·094	.....	14·2	13·7
20	Jan. 21–31....	43	1·05		33	.....	.....	7·2	10	0·3	.....	.....	97·6	64·0	0·087	.....	12·4	13·3
21	Average, 12 mos. (36 samples)	56	3·95	3·90	46·7	.....	.....	7·5	4	5	.....	.....	92·8	67·0	0·091	.....	11·1	12·8

* Left bank—South Thompson River
** Right bank—North Thompson River

													STATION No. 33: NORTH THOMPSON					
22	Aug. 27/49....	75	.....	.....	62	.....	..... (2·0)	7·6 (8·0)	15	7 (10)	20	17	82·3	47·0	0·064	.....	22·0	11·6

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: ±	Saturation index: −	No.
BRIDGE BELOW KAMLOOPS—*Continued*																					
1·7	1·9	0·8	.....	0·16	5·8	0	0·4	.....	0·01	39·5	0	.....	6·7	1·3	33·7	.....	.....	.....	.....	.....	1
1·4	1·2	0·8	.....	.....	6·8	0	.....	.....	.....	38·1 (34·2)	0 (0)	.....	5·4	3·5	34·7	.....	.....	.....	.....	.....	2
1·5	1·3	0·8	.....	.....	6·6	0	.....	.....	.....	43·9	0	.....	3·4	1·4 (6·0)	37·4 (38·0)	.....	.....	.....	.....	.....	3
1·6	1·8	0·6	0·46	0·03	6·9	0	0·5	0·10	.....	39·8	0	.....	8·3	2·4	35·0	.....	.....	.....	.....	.....	4
1·4	2·0	0·9	.....	0·08	6·6	0	0·5	0·05	.....	41·0	0	.....	10·6	1·4	35·0	.....	.....	.....	.....	.....	5
1·8	0·7	1·2	0·4	0·02	6·6	0	1·3	0	.....	38·6	0	.....	7·6	3·2	34·8	.....	.....	.....	.....	.....	6
1·6	2·0	0·9	.....	0·07	9·5	0·5	0·9	0·10	.....	39·3	0	5·2	7·5	2·8	35·0	.....	.....	.....	.....	.....	7
1·7	1·9	0·9	.....	0·12	7·4	0	0·5	0·10	.....	41·0	0	.....	9·0	2·6	36·2	.....	.....	.....	.....	.....	8
2·0	1·7	1·2	0·6	0·02	9·1	0	1·1	0·10	.....	40·7	0	.....	6·3	4·8	38·2	.....	.....	.....	.....	.....	9
1·9	2·2	0·7	.....	0·12	7·9	0	0·7	0·10	.....	39·8	0	.....	7·2	5·4	38·0	.....	.....	.....	.....	.....	10
1·9	2·1	0·7	.....	0·16	6·6	0	1·3	0·10	.....	43·4	0	.....	6·4	1·7	37·3	.....	.....	.....	.....	.....	11
1·8	1·9	1·0	.....	0·01	6·6	0	0	.....	0·05	43·4	0	.....	3·2	4·3	39·9	.....	.....	.....	.....	.....	12
2·0	1·3	0·8	.....	0·14	8·9	0	0·6	0·10	.....	43·7	0	.....	8·0	3·4	39·2	.....	.....	.....	.....	.....	13
2·1	2·5	1·1	.....	0·10	8·2	0	1·8	0·05	.....	43·9	0	.....	8·0	3·8	39·8	.....	.....	.....	.....	.....	14
2·1	2·2	0·9	.....	0·12	6·4	0	1·3	0·10	.....	46·4	0	.....	5·8	2·3	40·3	.....	.....	.....	.....	.....	15
2·1	2·0	0·9	.....	0·08	9·5	0	0·9	0·10	.....	43·9	0	.....	6·2	3·8	39·8	.....	.....	.....	.....	.....	16
2·5	2·0	1·0	.....	0·02	13·2	0	0·9	.....	.....	46·4	0	.....	3·6	7·0	45·0	.....	.....	.....	.....	.....	17
2·1	1·9	0·9	.....	0·07	7·0	0	2·2	0·10	.....	46·1	0	6·6	4·3	3·5	41·3	.....	.....	.....	.....	.....	18
2·1	1·9	0·8	.....	0·06	8·6	0	1·3	0·10	.....	46·1	0	6·2	5·0	5·0	42·8	.....	.....	.....	.....	.....	19
2·3	2·1	0·8	.....	0·08	10·2	0	1·3	0	.....	45·9	0	8·2	6·4	5·1	42·7	.....	.....	.....	.....	.....	20
2·0	2·5	0·7	.....	0·10	9·4	0	0·86	0·08	.....	44·2	0	.....	7·1	4·0	40·2	50·1	11·7	.....	.....	1·2	21
RIVER AT RAYLEIGH																					
1·8	1·3	1·0	1·2	0·01	6·3	0 (0)	0·9	0·05	.....	38·2 (37·8)	0 (0)	2·6	2·4	5·0	36·3	44·1	7·0	.....	.....	1·3	22

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance $K \times 10^6$ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 34: NORTH THOMPSON RIVER AT																	
			Gauge height in feet															
1	Feb. 20/50....	12	2,760	2,620	36	.....	.....	7·8	5	0·5	.....	.....	107	71·8	0·098	0·534	10·2	15·6
2	Mar. 20.....	7	2,760	2,810	37	.....	.....	7·7	5	0·4	.....	.....	116	73·0	0·099	0·544	6·4	16·8
3	Apr. 20.....	14	3,780	3,600	46	.....	.....	7·9	5	3	.....	.....	101	71·0	0·097	0·724	13·6	14·2
4	May 20.....	10	24,800	19,100	43	.....	.....	7·8	20	5	.....	.....	77·4	.....	.....	.....	.....	12·0
5	June 20.....	22	74,100	52,700	53	.....	.....	7·2	20	15	.....	.....	61·7	45·4	0·062	9·08	7·4	9·0
6	July 21.....	84	33,600	35,800	51	.....	.....	7·5	5	25	45	42	68·9	46·2	0·063	4·19	10·2	11·5
7	Aug. 7*.....	85	18,300	17,800	62	.....	.....	7·6	8	10	.....	.....	82·7	.....	.....	.....	.....	11·4
							(1·5)	(7·6)	(5)	(10)								
8	Aug. 19.....	77	15,300	17,800	58	.....	.....	7·4	5	9	.....	.....	77·2	.....	.....	.....	.....	12·3
9	Sept. 21.....	64	8,000	13,500	55	.....	.....	7·3	2	10	.....	.....	86·1	.....	.....	.....	.....	12·4
10	Oct. 21.....	92	6,080	7,200	48	.....	.....	7·6	3	5	11	98	90·4	62·2	0·084	1·01	10·8	13·5
11	Nov. 22.....	54	3,700	5,620	34	.....	.....	7·2	5	3	.....	.....	119	.....	.....	.....	.....	16·3
12	Dec. 21.....	43	3,780	4,020	36	.....	.....	7·4	10	15	.....	.....	102	.....	.....	.....	.....	18·8
13	Jan. 22/51....	22	2,810	3,070	37	.....	.....	7·4	7	0·5	.....	.....	116	75·4	0·103	0·573	10·4	17·6
14	Average..... (12 samples)	42	15,122	13,987	44·5	.....	.....	7·6	8	9	.....	.....	93·5	63·6	0·087	.....	9·8	14·2

* Field sample, not included in average.

STATION No. 35: NORTH THOMPSON RIVER

15	Sept. 5/50....	125	Fast	.....	54	.....	.....	7·6	20	85	53	52	53·3	40·4	0·055	.....	4·0	7·0
						(12·0)	(1·5)	(7·8)	.....	(4·5)								

STATION No. 36: CLEARWATER RIVER AT

16	Sept. 5/50....	106	Fast	.....	59	.....	.....	7·6	5	3	.....	.....	89·8	56·4	0·077	.....	7·4	16·2
							(2·0)	(8·0)	(10)	(<5)								

STATION No. 37: RAFT RIVER AT

17	Sept. 5/50....	106	.....	.....	57	.....	.....	7·6	10	3	.....	.....	78·6	56·4	0·077	.....	7·4	12·2
							(2·0)	(8·0)	(15)									

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[b]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
HIGHWAY BRIDGE, BARRIERE—Drainage area, 7,040 square miles																				
2·6	2·0	1·1	.....	0·03	10·0	0	0·7	0·05	0·06	53·7	0	6·6	7·0	5·6	49·6	.....	.....	.....	.....	1
3·3	2·4	1·1	.....	0·15	15·3	0	0·5	0·05	.....	58·8	0	7·2	6·7	7·3	55·5	.....	.....	.....	.....	2
2·3	2·2	1·4	.....	0·25	12·2	0	0	0·05	.....	51·2	0	8·8	6·0	2·9	44·9	.....	.....	.....	.....	3
1·8	0·9	0·7	.....	.....	10·5	0	.....	.....	0	41·5	0	.....	5·2	3·3	37·3	.....	.....	.....	.....	4
1·0	1·3	0·8	2·0	0·07	5·8	0	0·9	0·01	.....	31·7	0	.....	3·7	0·6	26·6	.....	.....	.....	.....	5
1·0	0·9	1·0	2·3	0·12	6·1	0	0·8	.....	.....	36·6	0	.....	4·2	2·8	32·8	.....	.....	.....	.....	6
1·2	1·3	0·8	.....	.....	6·2	0	.....	.....	.....	39·3	0	.....	3·1	1·1	33·3	.....	.....	.....	.....	7
1·2	0·9	0·8	.....	.....	8·6	0	.....	.....	0·01	36·8	0	.....	5·2	5·4	35·6	.....	.....	.....	.....	8
1·7	0·9	0·9	.....	.....	8·6	0	.....	.....	.....	42·0	0	.....	4·1	3·5	37·9	.....	.....	.....	.....	9
1·9	1·3	1·0	0·6	0·05	8·2	0	0·5	0·05	.....	47·1	0	.....	5·6	2·9	41·5	.....	.....	.....	.....	10
2·1	1·8	1·2	.....	.....	9·1	0	.....	.....	0·02	53·7	0	.....	3·2	5·5	49·5	.....	.....	.....	.....	11
2·5	1·8	1·1	.....	.....	15·6	0	.....	.....	.....	52·7	0	.....	4·0	13·8	57·0	.....	.....	.....	.....	12
2·7	1·8	1·1	.....	0·09	9·7	0	0·8	0·10	.....	61·0	0	6·6	6·4	5·0	55·0	.....	.....	.....	.....	13
2·0	1·6	1·0	.....	0·11	10·0	0	0·6	0·05	.....	47·1	0	.....	5·1	5·1	43·7	57·9	4·4	.....	1·0	14
AT HIGHWAY BRIDGE, CLEARWATER																				
1·5	1·8	1·6	5·1	0·44	7·4	0	0·5	0·05	.....	23·9 (22·0)	0 (0)	.....	4·8	4·0	23·6	36·7	13·2	.....	1·7	15
HIGHWAY BRIDGE, CLEARWATER																				
1·9	0·9	0·7	.....	0·08	5·8	0	1·2	0	.....	48·8 (46·6)	0 (0)	4·0	1·9	8·2	48·2	52·1	4·2	.....	1·0	16
HIGHWAY BRIDGE NEAR CLEARWATER																				
1·9	0·9	0·7	.....	0·08	5·0	0	0·7	0·05	.....	48·8	0	6·4	9·6	0	38·2	55·1	4·6	.....	1·2	17

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet): On sampling date	Stream discharge[a] (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance K x 10⁶ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids): Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
			Gauge height in feet															
	STATION No. 38: SOUTH THOMPSON RIVER																	
1	Feb. 20/50....	12	3,350	3,560	33	.....	.....	7·7	5	0·4	.....	.....	82·4	56·0	0·077	0·510	8·2	13·0
2	Mar. 20.....	7	3,000	3,040	39	.....	.....	7·7	5	0·3	.....	.....	83·7	55·6	0·076	0·450	6·6	12·5
3	Apr. 20.....	7	3,620	3,490	43	.....	.....	7·8	5	0·5	.....	.....	78·8	54·0	0·0735	0·528	9·0	13·4
4	May 20.....	10	11,700	9,540	49	.....	.....	7·8	5	0·4	.....	.....	85·5	.....	.....	.....	.....	12·8
5	June 20.....	16	34,000	28,200	49	.....	.....	7·5	5	0·5	.....	.....	79·2	.....	.....	.....	.....	11·0
6	June 26†.....	28	39,500	28,200	58	.....	.....	7·5	8	0·9	.....	.....	79·9	59·4	0·081	6·24	12·0	13·2
7	July 20.....	53	25,800	29,300	63	.....	.....	7·5	8	0·5	.....	.....	80·8	54·6	0·074	3·80	6·4	11·8
8	Aug. 7*.....	85	15,000	12,500	63	.....	.....	7·7	8	0·3	.....	.....	81·3	.....	.....	.....	.....	10·8
							(1·5)	(7·8)	(5)	.....								
9	Aug. 31.....	65	9,140	12,500	65	.....	.....	7·6	5	0·2	.....	.....	74·0	.....	.....	.....	.....	11·2
10	Sept. 20.....	161	8,560	9,900	67	.....	.....	7·9	2	0·4	.....	.....	70·6	.....	.....	.....	.....	10·3
11	Oct. 20.....	46	4,990	5,060	47	.....	.....	7·6	2	4	.....	.....	71·3	50·6	0·069	0·682	8·8	11·2
12	Nov. 20.....	70	4,510	4,660	40	.....	.....	7·5	5	0·5	.....	.....	73·2	.....	.....	.....	.....	11·2
13	Dec. 20.....	44	4,050	4,110	38	.....	.....	7·5	6	15	.....	.....	79·8	.....	.....	.....	.....	12·8
14	Jan. 20/51....	24	3,940	4,030	34	.....	.....	7·2	5	0·4	.....	.....	79·5	54·0	0·735	0·574	8·8	12·5
15	Average..... (12 samples)	43	4,560	9,782	47	.....	.....	7·6	5	0·6	.....	.....	78·2	54·1	0·074	.....	7·9	11·9

† Flood sample not included in average.
* Field sample not included in average.

STATION No. 39: ADAMS RIVER AT

16	Aug. 5/50....	122	3,960	2,350	61	.....	.....	7·5	5	0·7	.....	.....	61·2	46·0	0·064	0·491	8·2	9·2
							(0)	(8·0)	(5)	.....								

STATION No. 40: SHUSWAP

17	Aug. 5/50....	67	.....	.....	61·5	.....	.....	8·1	7	6	.....	.....	128	82·8	0·113	.....	11·0	24·6
							(0)	(8·5)	(10)	(8)								

STATION No. 41: SHUSWAP

18	Aug. 4/50....	52	.....	.....	67	.....	.....	7·7	40	1	.....	.....	86·2	63·4	0·086	.....	11·2	14·2
							(1·5)	(8·0)	.....	(<5)								

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
AT HIGHWAY BRIDGE, CHASE—Drainage area, 6,060 square miles																				
1·7	1·4	0·9	.....	0·03	8·7	0	0·4	0	0·02	41·5	0	5·8	6·8	5·4	39·4	.....	.....	.....	.....	1
2·0	1·3	0·8	.....	0·03	7·4	0	0·4	0·10	.....	45·9	0	6·4	6·0	1·8	39·4	.....	.....	.....	.....	2
2·1	1·2	0·8	.....	0·05	16·6	0	0	0·10	.....	39·0	0	7·4	6·2	10·0	42·0	.....	.....	.....	.....	3
1·8	1·1	0·7	.....	.....	11·5	0	.....	.....	0·02	43·7	0	.....	6·1	3·5	39·3	.....	.....	.....	.....	4
0·8	1·6	0·9	.....	.....	6·6	0	.....	.....	.....	41·0	0	.....	6·4	0	30·7	.....	.....	.....	.....	5
1·6	1·6	0·9	.....	0·11	12·0	0	0·98	0·05	.....	39·3	0	.....	7·8	7·3	39·5	.....	.....	.....	.....	6
1·8	1·6	0·9	.....	0·05	6·4	0·2	1·0	0·10	.....	39·0	0	8·2	5·8	4·8	36·8	.....	.....	.....	.....	7
1·2	1·4	0·8	.....	.....	3·5	0	.....	.....	.....	42·9	0	.....	5·8	0 (0)	31·8 (30·0)	.....	.....	.....	.....	8
1·2	1·3	0·8	.....	.....	6·2	0	.....	.....	0·02	36·6	0	.....	7·1	2·8	32·8	.....	.....	.....	.....	9
1·6	1·7	0·9	.....	.....	5·3	0	.....	.....	.....	36·4	0	.....	6·7	2·7	32·5	.....	.....	.....	.....	10
1·3	1·2	0·7	.....	0·05	7·1	0	0·4	0	.....	37·3	0	4·2	5·7	2·6	33·2	.....	.....	.....	.....	11
2·0	1·7	1·1	.....	.....	6·2	0	.....	.....	0	41·5	0	.....	5·7	2·0	36·0	.....	.....	.....	.....	12
1·9	1·7	1·1	.....	.....	12·1	0	.....	.....	.....	42·5	0	.....	5·4	5·2	40·0	.....	.....	.....	.....	13
1·8	0·8	0·6	.....	0·04	5·9	0	<·4	0·10	.....	42·0	0	5·2	6·2	4·2	38·6	.....	.....	.....	.....	14
1·7	1·4	0·9	.....	0·05	8·3	0	0·4	0·07	.....	40·5	0	.....	6·2	3·5	36·7	51·0	7·6	.....	1·2	15
HIGHWAY BRIDGE NEAR SQUILAX—Drainage area, 1,600 square miles																				
1·1	1·4	0·6	.....	0·06	6·6	0	0·5	0	.....	30·5	0	4·8	6·4	2·5	27·5	40·8	9·7	.....	1·5	16
LAKE AT SALMON ARM																				
3·0	2·7	1·1	0·42	0·07	9·7	0	0·3	0·10	.....	67·1 (61·1)	0 (4·8)	.....	9·3	18·7	73·7	84·0	9·0	.....	0·15	17
RIVER NEAR ENDERBY—Drainage area near Lumby, B.C.—650 square miles																				
1·4	0·8	0·7	.....	0·09	6·6	0	0·4	0	.....	46·4 (45·1)	0 (0)	.....	7·2	3·2 (5·0)	41·2 (42·0)	54·1	4·0	.....	0·9	18

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 42: MARA																		
1	Aug. 28/49....	12	.....	.....	70	.....	..... (2·0)	7·7 (8·2)	5 (5)	6	.....	.....	96·0	.....	.....	.....	.....	16·0
STATION No. 43: MARA																		
2	Aug. 4/50....	27	.....	.....	70	.....	..... (2·0)	7·7 (8·0)	8 (5)	1 (<5)	.....	.....	89·1	59·0	0·080	.....	9·4	16·4
STATION No. 44: SALMON RIVER FROM																		
3	Aug. 5/50....	103	.....	.....	62	.....	..... (0)	8·1 (8·0)	9 (6)	4	7·0	5·7	359	23·9	0·325	.....	19·4	43·9
STATION No. 45: EAST CANOE CREEK NEAR																		
4	Aug. 5/50....	67	.....	.....	59	.....	..... (3·0)	8·0 (7·9)	5 (5)	0·7	.....	.....	362*	213*	0·290	.....	9·8	67·7*
STATION No. 46: EAGLE																		
5	Aug. 4/50....	104	.....	.....	49	.....	....	7·4 (7·6)	6 (5)	6 (5)	.....	.....	49·4	.....	.....	.....	.....	6·7
STATION No. 47: EAGLE																		
6	Aug. 29/49....	32	.....	.....	59	.....	.....	7·2	10	5	10·0	7·2	49·2	53·6	0·073	.....	21·8	9·2
STATION No. 48: NORTH FORK EAGLE																		
7	Aug. 4/50....	104	.....	.....	49	.....	..... (1·0)	7·5 (7·6)	5 (5)	6 (5)	8·2	6·6	33·6	26·0	0·035	.....	5·6	5·0
STATION No. 49: NICOLA RIVER AT																		
8	Aug. 8/50....	23	.....	.....	67	.....	..... (5·0)	8·5 (8·6)	10	3	.....	.....	249	147	0·200	.....	17·0	30·8

* Calcium corrected for loss on storage; conductivity and residue on evaporation low.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
LAKE NEAR MARA																				
1·5	1·4	1·0	.....	.....	9·8	0	.....	.....	.....	48·6 (51·3)	0 (0)	.....	6·8	6·3	46·1	60·4	6·0	.....	0·9	1
LAKE NEAR SICAMOUS																				
1·7	1·4	0·9	.....	0·05	11·0	0	0	0·05	.....	48·3 (46·5)	0 (0)	.....	3·3	8·3	47·9	23·7	5·8	.....	0·8	2
HIGHWAY BRIDGE AT SALMON ARM																				
12·9	13·7	2·9	0·50	0·03	31·8	0	0·4	0·20	.....	194 (187)	4·8 (4·8)	.....	27	0 (13·0)	163 (174)	233	15·2	0·5	.....	3
SALMON ARM—Drainage area of Canoe Creek, 62 square miles																				
7·0	2·7	1·5	.....	0·06	20·9	0	0	0·05	.....	217	0	.....	18	19·7	198	225	2·9	0·65	.....	4
RIVER NEAR SICAMOUS																				
0·8	0·7	0·8	.....	.....	2·3	0	.....	.....	.....	26·4 (17·1)	0 (0)	.....	4·5	0	20·0	28·8	6·7	.....	1·8	5
RIVER NEAR MALAKWA																				
0·7	1·3	1·2	0·12	Trace	10·0	0	0·35	0·15	.....	21·9	0	.....	5·2	2·9	20·9	38·9	9·4	.....	2·0	6
RIVER (PERRY RIVER) NEAR CRAIGELLACHIE																				
0·6	0·5	0·5	0·64	0·06	3·5	0	0·4	0·05	.....	17·1 (17·1)	0 (0)	.....	4·8	1·0 (0)	15·0 (14·0)	23·8	6·5	.....	2·2	7
MOUTH, NEAR SPENCES BRIDGE																				
8·6	7·8	1·8	.....	0·04	19·6	0	0	0·05	.....	112 (110)	9·6 (8·4)	.....	4·9	4·2 (6·0)	112 (110)	138	12·9	0·6	.....	8

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10⁶ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 50: NICOLA RIVER AT																	
1	July 29/49....	47	.....	.....	66	.....	..... (0)	8·4 (8·8)	20 (20)	3	.....	.....	228	163	0·222	.....	67·2	40·4
	STATION No. 51: COLDWATER																	
2	July 29/49....	81	.....	.....	59	.....	..... (5·0)	7·5 (7·5)	0 (5)	4	.....	.....	113	80·6	0·111	.....	7·8	17·0
	STATION No. 52: BONAPARTE																	
3	Aug. 8/50....	160	.....	.....	62	.....	..... (0)	8·2 (8·2)	10	40 (35)	79	71	494	295	0·402	.....	32·4	53·8
	STATION No. 53: DEADMAN																	
4	Aug. 8/50....	78	.....	.....	58	.....	..... (0)	8·5 (8·5)	5 (5)	0·5	.....	.....	384	225	0·306	.....	25·0	39·0
	STATION No. 54: SETON																	
5	*Aug. 18/50....	124	.....	.....	60	.....	..... (1·5)	7·6 (7·7)	2 (<5)	3	.....	.....	105	63·8	0·087	.....	9·6	20·8
	STATION No. 55: BRIDGE RIVER (NORTH FORK)																	
6	Apr. 4/51....	55	.....	.....	44	.....	.....	7·7	.....	50	45	40	146	90·6	0·123	.....	29·0	17·3
	STATION No. 56: SAN JOSÉ RIVER																	
7	Aug. 19/50**..	123	.....	.....	64	..... (9·4)	..... (0)	8·5 (8·7)	5 (15)	0·9	.....	.....	475	301	0·410	.....	77·2	28·0
	STATION No. 57: WILLIAMS LAKE																	
8	Aug. 21/50....	51	.....	.....	69	....	..... (0)	8·5 (8·8)	10 (30)	0·6	.....	.....	525	345	0·470	.....	91·8	31·3

* Sample partly lost by spillage during transit.

** Calcium precipitated, but corrected for loss.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
HIGHWAY BRIDGE NEAR NICOLA																				
8·9	8·0	2·8	.....	0·10	22·4	0 (0)	0·7	0	.....	167 (112)	5·8 (9·6)	8·4	4·0	0	137	175	11·0	0·7	.....	1
RIVER NEAR MERRITT																				
3·4	2·9	0·6	0·08	0·04	6·3	0·1	Trace	0·05	.....	67·1 (69·5)	0 (0)	8·2	10·2	1·4	56·4	73·6	10·0	.....	1·0	2
RIVER AT CACHE CREEK																				
22·5	17·4	2·8	4·0	0·05	47·2	0	0·7	0·20	.....	245 (253)	11·5 (2·4)	.....	18	7·0 (11·0)	227 (232)	295	14·3	0·8	.....	3
RIVER NEAR SAVONA																				
15·5	14·8	2·5	0·10	.....	19·9	0	0·4	0	.....	199 (229)	14·4 (12·2)	20·6	19·8	0	161	224	16·4	0·9	.....	4
LAKE NEAR LILLOOET																				
1·9	1·8	1·1	.....	0·1	9·9	0 (0)	0	.....	.....	61·0 (42·7)	0 (0)	8·4	6·1	9·7	59·7	71·7	5·9	.....	0·8	5
NEAR LILLOOET—Drainage area near Bridge River, 1,350 square miles																				
6·4	3·5	1·3	1·8	0·09	13·6	1·6	0	0·10	.....	74·9	0	.....	7·0	8·1	69·5	87·8	9·7	.....	0·7	6
(LAC LA HACHE) NEAR WRIGHT																				
32·5	26·8	4·8	.....	0·07	10·9	0	1·2	0·15	.....	298 (266)	16·6 (26·4)	16	18	0	204	286	21·0	0·9	.....	7
AT WILLIAMS LAKE																				
37·5	32·5	4·5	.....	0·08	15·1	0	0·7	0·25	.....	314 (300)	27·4 (30)	.....	11	0 (0)	232 (250)	315	22·9	1·0	.....	8

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet) On sampling date	Stream discharge* (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10⁶ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 58: CHILCOTIN RIVER NEAR																	
1	Feb. 19/50	18			33			7·7	3	5	9·6	5·2	108	71·4	0·097		7·8	10·2
2	Mar. 19	17			32·5			7·9	3	5	6·2	5·2	134	80·8	0·110		8·4	11·3
3	Apr. 21	18			38			7·9	20	5	14	11	173	112	0·1525		20·4	13·0
4	May 22	45			42			7·9	15	5			138					11·1
5	June 21	33			53			7·7	5	130	154	145	81·6	62·8	0·085		5·0	9·2
6	July 19	86			58			7·8	5	25	28	26	74·7	52·8	0·072		16·8	10·8
7	Aug. 17	63			57			7·7	7	7			82·6					10·3
8	Aug. 20*	110			60	(9·7)	(1·0)	6·9 (7·7)	3 (25)	15 (20)			73·9					10·8
9	Sept. 23	83			56			7·7	4	25			79·7					9·0
10	Oct. 27	87			40			7·8	10	6	5·6	5·3	102	67·4	0·092		8·6	9·3
11	Nov. 23	67			33			7·6	10	15			87·8					10·2
12	Dec. 19	50			33			7·3	7	5			107					10·7
13	Jan. 20/51	24			32·5			7·6	5	3			126	81·8	0·111		13·0	11·7
14	Average (12 samples)	48			42·3			7·6	8	20			107·8	75·6	0·103		11·4	10·6
	STATION No. 59: CHILKO RIVER NEAR																	
15	Feb. 19/50	18	610	602	32·5			7·7	0	5	6·6	4·2	76·8	52·4	0·071	0·086	5·2	10·6
16	Mar. 19	17	640	659	32·5			7·7	0	5	7·2	6·2	86·7	50·0	0·068	0·086	4·0	10·7
17	Apr. 21	18	665	624	36·5			7·8	10	5	7·4	5·4	89·7	58·8	0·080	0·105	5·8	11·8
18	May 22	45	2,470	1,940	45			7·9	5	7			86·0					11·2
19	June 21	49	16,700	9,760	50			7·6	5	140	137	132	61·9	48·6	0·066	2·19	8·0	8·9
20	July 19	86	9,630	10,300	56			7·4	3	25	24	21	59·2	44·8	0·061	1·161	12·0	9·7
21	Aug. 17	63	6,070	6,930	57			7·4	10	15			65·2					9·4
22	Sept. 23	83	4,950	3,490	55			7·7	5	25			55·9					8·3
23	Oct. 27	98	2,050	2,610	40			7·6	7	6	5·4	3·7	63·7	46·2	0·063	0·256	6·2	9·0
24	Nov. 23	67	1,940	2,180	33			7·4	7	7			63·0					10·2
25	Dec. 19	56	1,060	1,210	33			7·4	7	5			66·7					9·2
26	Jan. 20/51	37	754	839	32			7·6	5	6	3·8	2·9	80·1	49·6	0·0625	0·101	4·6	11·3
27	Average (12 samples)	53	3,962	3,429	41·9			7·6	5	20			71·2	50·1	0·068		5·5	10·1

* Field sample, not included in average.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Totale	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
ALEXIS CREEK—Drainage area, 2,400 square miles																				
4·4	4·8	1·4	0·55	0·09	9·2	0	0	0·05	.....	61·5	0	10·4	10·6	0	43·5	.....	.....	.....	.....	1
6·1	6·0	1·7	0·66	0·03	16·5	0	0	0·05	0	74·4	0	12·6	11·9	0	53·3	.....	.....	.....	.....	2
8·1	10·2	3·2	0·9	0·09	6·7	0	0	0·10	.....	105	0	18·4	15·7	0	65·7	.....	.....	.....	.....	3
5·8	7·5	2·5	6·5	.....	4·7	0	.....	.....	0·01	83·4	0	.....	16·8	0	51·6	.....	.....	.....	.....	4
2·3	3·3	1·5	5·8	0·33	6·4	0	0	.....	.....	43·4	0	.....	7·4	0	32·5	.....	.....	.....	.....	5
1·9	2·8	1·0	1·2	0·20	4·8	0	0·40	.....	.....	42·0	0	.....	6·2	0·3	34·7	.....	.....	.....	.....	6
2·0	3·2	1·0	.....	.....	8·2	0	.....	.....	0	45·9	0	.....	7·1	0	33·9	.....	.....	.....	.....	7
1·5	2·8	0·9	.....	.....	8·2	0 (0)	0	.....	.....	35·4 (32·9)	0 (0)	.....	1·0	4·2 (13·5)	33·2 (50·5)	.....	.....	.....	.....	8
2·3	3·3	1·2	.....	.....	7·4	0	.....	.....	.....	42·7	0	.....	5·0	0	32·0	.....	.....	.....	.....	9
4·3	4·8	1·5	0·6	0·10	4·6	0	0	0·10	.....	61·2	0	.....	9·8	0	40·9	.....	.....	.....	.....	10
3·0	3·5	1·3	.....	.....	2·5	0	.....	.....	0	58·6	0	.....	6·4	0	38·0	.....	.....	.....	.....	11
4·4	4·8	1·5	.....	.....	7·4	0	.....	.....	.....	63·4	0	.....	9·2	0	45·0	.....	.....	.....	.....	12
5·4	5·3	1·4	.....	0·17	3·8	0	0·4	0·05	.....	76·1	0	12·8	10·8	0	51·4	.....	.....	.....	.....	13
4·2	4·9	1·6	.....	0·14	6·9	0	0·1	0·07	.....	63·1	0	.....	9·3	0	43·7	68·9	18·9	.....	1·0	14
REDSTONE—Drainage area, 3,230 square miles																				
1·9	2·2	0·7	0·18	0·09	10·5	0	0	0	0·11	39·3	0	5·2	4·8	2·0	34·2	.....	.....	.....	.....	15
2·4	2·4	0·8	0·05	0·03	17·3	0	0	0	.....	42·7	0	4·4	4·6	0·2	36·6	.....	.....	.....	.....	16
2·1	3·2	1·0	0·5	0·08	10·5	0	0	0·08	.....	47·6	0	6·2	5·8	0	38·0	.....	.....	.....	.....	17
1·5	3·2	0·9	.....	.....	8·4	0	.....	.....	0·05	46·4	0	.....	8·8	0	34·1	.....	.....	.....	.....	18
1·2	1·6	0·8	8·2	0·32	6·4	0	0	0	.....	30·7	0	.....	4·7	1·9	27·1	.....	.....	.....	.....	19
0·8	1·6	0·8	1·4	0·32	6·4	0	0·4	.....	.....	31·7	0	.....	4·2	1·5	27·5	.....	.....	.....	.....	20
0·6	1·7	0·6	.....	.....	6·6	0	.....	.....	0	29·8	0	.....	4·6	1·6	26·0	.....	.....	.....	.....	21
0·8	1·5	0·7	.....	.....	5·6	0	.....	.....	.....	28·1	0	.....	3·1	1·0	24·0	.....	.....	.....	.....	22
1·3	1·8	0·7	0·5	0·12	5·6	0	0·4	0·10	.....	33·4	0	.....	4·4	0·6	28·0	.....	.....	.....	.....	23
1·4	1·8	0·9	.....	.....	4·5	0	.....	.....	0·02	41·5	0	.....	3·1	0	31·0	.....	.....	.....	.....	24
1·5	1·6	0·5	.....	.....	6·7	0	.....	.....	.....	34·2	0	.....	4·6	1·1	29·1	.....	.....	.....	.....	25
1·7	2·1	0·6	0·23	0·04	3·9	0	0·4	0	0	43·9	0	4·8	3·1	0	35·2	.....	.....	.....	.....	26
1·4	2·1	0·8	.....	0·14	7·7	0	0·2	0·03	.....	37·4	0	.....	4·6	0·2	31·0	49·5	12·5	.....	1·2	27

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet): On sampling date	Stream discharge[a] (Second-feet): Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter: Dried at 105°C.	Suspended matter: Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids): P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids): Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids): Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 60: HORSEFLY RIVER AT																		
1	Aug. 19/50....	123	341	411	64	.....	..... (0)	7·9 (8·0)	5 (10)	0·9 (clear)	.....	.....	94·7	61·0	0·083	0·056	8·8	14·0
STATION No. 61: QUESNEL RIVER AT GRAVELLE FERRY,																		
			Gauge height in feet															
2	Feb. 19/50....	13	2,820	3,000	35	.....	.....	8·1	5	5	11·2	9·0	138	90·0	0·1225	0·684	12·4	23·2
3	Mar. 19.....	17	2,390	2,440	35	.....	.....	8·0	0	0·3	.....	.....	151	89·0	0·121	0·574	6·8	23·3
4	Apr. 19.....	20	3,440	3,150	38	.....	.....	7·9	25	55	66	63	158	103	0·140	0·956	9·8	24·2
5	May 20.....	10	10,400	9,740	42	.....	.....	8·2	20	25	.....	.....	139	.....	.....	.....	.....	21·6
6	June 19.....	24	29,700	23,100	55	.....	.....	7·9	5	200	258	245	121	83·2	0·113	6·67	7·2	20·5
7	July 19.....	86	16,800	18,400	61	.....	.....	7·9	3	50	59	55	113	77·4	0·105	3·51	9·2	20·4
8	Aug. 19.....	61	8,360	9,390	58	.....	.....	7·8	7	9	.....	.....	115	.....	.....	.....	.....	20·7
9	Aug. 22*.....	106	8,080	9,390	63	..... (9·9)	..... (1·0)	7·9 (7·9)	3	15 (10)	.....	.....	116	.....	.....	.....	.....	19·0
10	Sept. 24.....	82	5,430	7,750	58	.....	.....	8·0	2	15	.....	.....	117	.....	.....	.....	.....	19·4
11	Oct. 19.....	94	5,590	5,520	46	.....	.....	7·7	4	10	18	17	117	77·2	0·105	1·16	6·4	19·4
12	Nov. 19.....	71	5,100	5,660	34	.....	.....	7·6	5	8	.....	.....	122	.....	.....	.....	.....	20·5
13	Dec. 19.....	50	4,110	4,320	34	.....	.....	7·6	6	5	.....	.....	174	.....	.....	.....	.....	28·8
14	Jan. 19/51....	25	3,630	3,730	32	.....	.....	7·8	0	3	.....	.....	138	88·8	0·121	0·870	9·2	23·8
15	Average..... (12 samples)	46	8,148	8,017	44	.....	.....	7·9	7	25	.....	.....	134	86·9	0·118	.....	8·7	22·1

* Field sample, not included in average.

STATION No. 62: COTTONWOOD

16	Aug. 23/50....	133	.....	.....	64	..... (9·7)	..... (1·0)	7·7 (7·8)	15 (20)	6 (5)	14	12	107	72·8	0·099	.....	19·2	15·6

TABLE II

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
HIGHWAY BRIDGE AT HORSEFLY																				
2·5	1·8	0·9	.....	0·09	5·4	0 (0)	1·1	0	.....	48·8 (40·2)	0 (2·4)	8·2	8·7	5·2 (6·0)	45·2 (44·0)	58·4	7·6	.....	0·8	1
NEAR QUESNEL—Drainage area, 3,900 square miles																				
3·2	1·1	0·3	0·28	0·08	9·6	0	0·6	0	0·06	73·2	1·2	5·0	4·2	9·1	71·1	.....	.....	.....	.....	2
3·8	1·8	0·5	.....	0·05	15·2	0	0·5	0	.....	81·3	0	4·8	4·8	6·1	73·7	.....	.....	.....	.....	3
3·7	2·6	0·7	3·7	0·23	10·7	0	0·6	0·10	.....	87·1	0	7·2	6·4	4·2	75·6	.....	.....	.....	.....	4
3·4	1·3	0·4	.....	.....	9·3	0	.....	.....	0	70·0	3·6	.....	4·5	4·5	67·9	.....	.....	.....	.....	5
1·6	1·4	0·6	14·7	0·23	7·9	0	0·9	0·05	.....	62·5	2·4	.....	5·0	2·5	57·7	.....	.....	.....	.....	6
2·4	1·6	0·4	2·2	0·09	7·1	0	0·8	0	.....	63·0	0	.....	6·2	9·2	60·8	.....	.....	.....	.....	7
1·6	0·9	0·3	.....	.....	11·1	0	0	.....	0	58·6	0	.....	3·8	10·2	58·2	.....	.....	.....	.....	8
2·3	1·1	0·3	.....	.....	5·3 (8·0)	0 (0)	.....	.....	.....	66·1 (61·7)	0 (0)	.....	3·8	2·7 (8·4)	56·9 (59·0)	.....	.....	.....	.....	9
2·2	1·7	0·4	.....	.....	10·1	0	.....	.....	.....	64·7	0	.....	3·3	4·5	57·5	.....	.....	.....	.....	10
2·7	1·1	0·3	1·4	0·05	7·7	0	0·4	0·05	.....	68·3	0	.....	6·4	3·5	59·5	.....	.....	.....	.....	11
2·9	1·3	0·4	.....	.....	6·8	0	.....	.....	0·01	68·1	0	.....	4·3	7·2	63·0	.....	.....	.....	.....	12
4·5	2·2	0·8	.....	.....	10·7	0	.....	.....	.....	100	0	.....	2·4	8·3	90·5	.....	.....	.....	.....	13
3·2	1·0	0·2	.....	0·27	7·6	0	0·4	0·05	.....	78·1	0	5·8	3·8	8·5	72·5	.....	.....	.....	.....	14
2·9	1·5	0·4	.....	0·14	9·5	0	0·6	0·04	.....	72·9	0·6	.....	4·6	7·4	67·1	78·3	4·5	.....	0·4	15
RIVER NEAR QUESNEL																				
3·2	1·8	0·4	0·70	0·06	8·6	0	0	0·10	.....	59·8 (58·6)	0 (0)	.....	7·0 (6·0)	3·1	52·1	65·6	6·9	.....	0·9	16

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge* (Second-feet) On sampling date	Stream discharge* (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Tons per acre-foot	Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 63: NECHAKO RIVER																	
			Gauge height in feet															
1	Apr. 17/50....	15	†	†	33	.....	.....	7·0	20	9	13	11	224	114	0·155	.....	10·6	27·2
2	May—No sample taken.....			14,800														
3	June 18.....	39	27,700	26,600	65	.....	.....	7·6	20	5	19	16	88·5	59·6	0·081	4·46	14·8	11·9
4	July—No sample taken.....			29,900														
5	Aug. 18.....	78	16,500	17,400	63	.....	.....	7·4	15	0·4	.....	.....	76·4	55·8	0·076	2·49	18·4	9·4
6	Sept. 15.....	70	11,000	11,000	.....	.....	.....	7·7	10	2	.....	.....	81·8	.....	.....	.....	.....	10·3
	STATION No. 64: CHILAKO RIVER NEAR																	
7	Aug. 25/50....	112	.....	.....	61	..... (9·2)	..... (3·0)	7·9 (8·1)	20 (25)	6 (5)	.....	.....	284	.....	.....	.....	.....	30·0
	STATION No. 65: NECHAKO RIVER AT																	
8	Sept. 18/50....	110	.....	.....	62	..... (10·6)	..... (1·5)	6·8 (7·5)	20 (10)	5 (clear)	.....	.....	55·9	.....	.....	.....	.....	10·8
	STATION No. 66: STUART RIVER AT FORT																	
9	Mar. 21/50....	15	1,430e	1,480	34	.....	.....	7·9	0	0·4	.....	.....	106	69·8	0·095	0·269	16·0	13·2
10	Apr. 15.....	12	1,180e	1,250	39	.....	.....	7·9	8	2	.....	.....	99·2	76·0	0·103	0·242	19·0	15·6
11	May 16.....	14	3,080	3,200	34	.....	.....	7·7	7	0·5	.....	.....	80·5	.....	.....	.....	.....	10·9
12	June 15.....	27	7,630e	7,740	60	.....	.....	7·8	5	2	.....	.....	93·5	127	0·173	2·620	54·6	13·2
13	July 15.....	58	10,700e	10,200	61	.....	.....	7·7	20	0·5	.....	.....	92·4	74·2	0·101	2·144	14·2	13·2
14	Aug. 15.....	65	7,260e	7,090	58	.....	.....	8·0	20	3	.....	.....	90·2	.....	.....	.....	.....	13·1
15	Aug. 25*.....	143	6,030	7,090	67	..... (9·8)	..... (0)	7·8 (8·2)	8 (20)	0·8	.....	.....	89·6	63·6	0·087	0·403	16·4	12·8
16	Sept. 14.....	167	4,320e	4,260	.....	.....	.....	7·6	20	1	.....	.....	90·1	.....	.....	.....	.....	12·4
17	Oct. 17.....	49	2,590e	2,620	43	.....	.....	7·8	3	2	.....	.....	92·4	67·0	0·091	0·468	22·4	11·9

† Records at Isle Pierre, drainage area 16,200 square miles.

e—estimated

* Field sample, not included in average.

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
NEAR MOUTH AT PRINCE GEORGE																				
5·7	2·0	0·7	1·1	0·10	11·7	0	0·7	0·10	.....	99·8	0	8·4	5·9	9·6	91·4	103	4·5	.....	1·1	1
																				2
2·9	2·4	0·9	0·8	0·04	4·6	0	1·3	0·10	.....	49·8	0	.....	5·4	0·8	41·6	54·0	10·5	.....	1·1	3
																				4
2·2	2·0	0·4	.....	0·12	3·0	0	0·4	.....	0·001	41·5	0	.....	5·0	0	32·6	42·9	11·6	.....	1·5	5
2·4	1·8	0·4	.....	.....	3·1	.....	.....	.....	.....	48·8	0	.....	4·9	0	35·6	46·9	9·8	.....	1·1	6
MOUTH, NEAR PRINCE GEORGE																				
14·5	6·8	2·5	.....	.....	6·0	0 (0)	.....	.....	.....	184 (181)	0 (0)	.....	11·2	0	135	162	9·7	0·05	.....	7
HIGHWAY BRIDGE AT VANDERHOOF																				
3·1	2·0	0·3	.....	.....	15·2	0	0	.....	.....	34·2 (25·6)	0 (0)	.....	2·4	7·2	35·2	50·6	9·8	.....	2·2	8
ST. JAMES—Drainage area, 5,400 square miles																				
3·5	1·8	0·4	.....	0·05	12·3	0	0	0·10	.....	57·1	0	5·8	4·9	0	47·3	.....	.....	.....	.....	9
3·6	2·0	0·5	.....	0·10	16·6	0	0	0·15	0	53·7	0	8·0	5·4	9·7	53·7	.....	.....	.....	.....	10
2·3	1·7	0·3	.....	.....	5·4	0	.....	.....	.....	46·8	0	.....	4·6	0	36·7	.....	.....	.....	.....	11
2·9	2·0	0·4	.....	0·04	6·1	0	0	0·10	.....	53·4	0	.....	4·8	1·0	44·8	.....	.....	.....	.....	12
3·2	2·2	0·4	.....	0·11	4·9	0	0	0·10	.....	52·5	0	9·6	6·1	3·1	46·1	.....	.....	.....	.....	13
2·3	2·0	0·3	.....	.....	8·8	0	.....	.....	0·01	51·2	0	.....	5·7	0·2	42·2	.....	.....	.....	.....	14
2·7	1·9	0·6	.....	0·09	4·3	0	0·4	0·12	.....	54·2 (50·0)	..... (0)	4·8	5·0	0	43·0	.....	.....	.....	.....	15
3·2	2·0	0·6	.....	.....	4·7	0	.....	.....	.....	51·2	0	.....	6·0	2·0	44·0	.....	.....	.....	.....	16
2·8	1·8	0·4	.....	0·07	5·6	0	0·4	0	.....	53·2	0	4·2	5·4	0	41·2	.....	.....	.....	.....	17

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10⁶ at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
	STATION No. 66: STUART RIVER AT																	
			Gauge height in feet															
1	Nov. 14.....	58	1,760[e]	1,760	33	.....	.....	7·6	10	4	.....	.....	91·6	.....	.....	.....	.....	13·5
2	Dec. 14.....	6	1,460[e]	1,460	34	.....	.....	7·8	15	2	.....	.....	96·2	.....	.....	.....	.....	15·2
3	Jan. 16/51....	28	1,220	1,220	32	.....	.....	7·5	20	0·4	.....	.....	95·3	.....	.....	.....	.....	13·1
4	Feb. 15.....	33	1,120[e]	1,110	32	.....	.....	7·7	20	0·3	.....	.....	107	68·2	0·093	0·206	19·2	14·1
5	Average..... (12 samples)	43	3,646	3,615	38	.....	.....	7·8	12	1·5	.....	.....	94·5	80·4	0·109		24·2	13·2
	[e]—estimated																	
	STATION No. 67: NECHAKO RIVER AT FORT																	
6	Feb. 15/50....	17	.....	8,900	36	.....	.....	7·3	5	2	.....	.....	55·8	42·6	0·058	.....	12·0	8·8
7	Mar. 16.....	11	.....	.....	33	.....	.....	7·7	7	3	.....	.....	58·7	41·6	0·0566	.....	7·2	8·2
8	Apr. 15.....	12	.....	.....	33	.....	.....	7·5	5	3	.....	.....	49·7	40·6	0·055	.....	10·0	7·6
9	May 15/50....	15	6,570	7,810	48	.....	.....	7·5	25	6	.....	.....	66·4	.....	.....	.....	.....	9·6
10	June 15.....	27	15,500	15,740	62	.....	.....	7·3	5	5	12·2	6·4	50·0	80·6	0·110	3·37	47·6	6·9
11	July 15.....	58	16,900	16,260	62	.....	.....	7·2	10	0·9	.....	.....	45·0	35·6	0·048	1·62	8·6	6·4
12	Aug. 15.....	65	8,250	8,340	61	.....	.....	7·4	10	3	.....	.....	46·2	.....	.....	.....	.....	8·5
13	Sept. 16.....	165	5,310	5,350	60	.....	.....	7·4	10	0·6	.....	.....	45·8	.....	.....	.....	.....	6·3
14	Oct. 14.....	52	4,220	4,360	45	.....	.....	7·6	2	2	.....	.....	46·4	36·6	0·050	0·417	10·0	6·7
15	Nov. 14.....	76	4,370	4,310	35	.....	.....	7·5	7	4	.....	.....	35·7	.....	.....	.....	.....	6·1
16	Dec. 16.....	48	ice		33	.....	.....	7·5	7	15	.....	.....	50·3	.....	.....	.....	.....	8·5
17	Jan. 16/51....	28	conditions		32	.....	.....	7·2	10	3	.....	.....	47·4	39·8	0·054	.....	11·8	6·4
18	Average..... (12 samples)	48	8,303	8,884	45	.....	.....	7·4	9	4	.....	.....	49·8	45·3	0·0616	.....	15·3	7·5
	STATION No. 68: NORTHERLY																	
19	Aug. 26/50....	60	.....	.....	60	..... (10·4)	..... (0)	7·8 (8·2)	10 (20)	0·6	.....	.....	88·2	66·4	0·090	.....	16·4	13·6
	STATION No. 69: STELLAKO																	
20	Sept. 1/50....	136	.....	.....	61	..... (10·2)	..... (2·5)	7·8 (7·8)	6	1	.....	.....	90·7	71·4	0·097	.....	23·0	11·6

TABLE II—Continued

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Continued

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: −	No.
FORT ST. JAMES—Continued																				
4·0	2·0	0·6	.....	.....	.....	0	0	.....	0·03	53·2	3·5	.....	3·2	0·1	50·1	.....	.....	.....	.....	1
3·5	1·8	0·3	.....	.....	.....	0	0	.....	.....	56·1	0	.....	4·8	6·1	52·1	.....	.....	.....	.....	2
3·1	0·5	0·3	.....	.....	4·6	0	.....	.....	.....	52·5	0	.....	5·0	2·5	45·5	.....	.....	.....	.....	3
3·2	1·7	0·4	.....	0·04	5·8	0	0·7	0	.....	58·3	0	7·6	4·7	0·5	48·3	.....	.....	.....	.....	4
3·1	1·8	0·4	.....	0·07	6·2	0	0·1	0·06	.....	53·2	0	.....	5·5	2·1	45·7	56·7	7·8	.....	0·8	5
FRASER—Drainage area, 6,700 square miles																				
0·9	1·3	0·3	.....	0·06	3·5	0	0	0·05	0·16	31·7	0	3·6	4·4	0	25·7	.....	.....	.....	.....	6
1·5	1·8	0·4	.....	0·04	5·4	0	Trace	0·05	.....	34·2	0	6·2	4·2	0	26·7	.....	.....	.....	.....	7
1·5	1·2	0·5	.....	0·10	11·4	0	0	0·10	.....	24·4	0	4·2	3·4	5·2	25·2	.....	.....	.....	.....	8
1·6	2·0	0·7	.....	.....	8·4	0	.....	.....	0	41·0	0	.....	5·8	0	30·5	.....	.....	.....	.....	9
1·1	1·6	0·3	0·6	0·08	3·8	0	0	0·05	.....	27·3	0	.....	4·2	0	21·7	.....	.....	.....	.....	10
0·8	1·3	0·3	.....	0·08	3·6	0	0	0	.....	22·0	0	5·8	3·1	1·3	19·3	.....	.....	.....	.....	11
0·8	1·5	0·2	.....	.....	7·4	0	.....	.....	0·01	24·4	0	.....	4·6	4·5	24·5	.....	.....	.....	.....	12
1·2	1·7	0·4	.....	.....	3·1	0	.....	.....	.....	26·8	0	.....	5·1	0	20·5	.....	.....	.....	.....	13
0·9	1·4	0·2	.....	0·07	5·9	0	0·4	0·10	.....	24·4	0	4·2	4·6	0·4	20·4	.....	.....	.....	.....	14
1·3	1·5	0·5	.....	.....	2·5	0	.....	.....	0	25·6	0	.....	4·4	0	20·5	.....	.....	.....	.....	15
1·4	1·2	0·3	.....	.....	6·8	0	.....	.....	.....	29·3	0	.....	3·8	3·0	27·0	.....	.....	.....	.....	16
1·2	1·2	0·7	.....	0·12	3·0	0	0·4	0·10	.....	26·8	0	5·2	4·7	0	20·9	.....	.....	.....	.....	17
1·2	1·5	0·4	.....	0·8	5·4	0	.....	0·06	0·07	28·1	0	.....	4·4	0·6	23·6	34·4	11·9	.....	1·7	18
RIVER NEAR FORT FRASER																				
2·3	3·3	0·7	.....	0·05	4·3	0 (0)	0·4	0·15	.....	56·1 (46·4)	0 (2·4)	6·4	4·9	0 (2·0)	43·4 (44·0)	57·2	13·9	.....	0·95	19
RIVER NEAR FORT FRASER																				
2·3	3·9	1·0	.....	0·16	4·3	0	0·7	.....	.....	56·6 (50·0)	..... (0)	7·8	5·2	0	38·4	57·1	17·6	.....	1·0	20

TABLE II—Concluded

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Concluded

(In parts per million)

No.	Date of collection	Storage period (Days)	Stream discharge[a] (Second-feet) On sampling date	Stream discharge[a] (Second-feet) Monthly mean	Water temperature (°F.)	Dissolved oxygen	Carbon dioxide	pH	Colour	Turbidity	Suspended matter Dried at 105°C.	Suspended matter Ignited at 550°C.	Specific conductance K x 10^6 at 25°C.	Residue on Evaporation dried at 105°C. (Dissolved solids) P.P.M.	Residue on Evaporation dried at 105°C. (Dissolved solids) Tons per acre-foot	Residue on Evaporation dried at 105°C. (Dissolved solids) Thousand tons per day	Loss on ignition at 550°C.	Calcium (Ca)
STATION No. 70: BURNS LAKE																		
1	Sept. 1/50....	136	.....	.....	59	..... (9·2)	..... (4·0)	7·5 (7·5)	35 (60)	3	.....	.....	108	101	0·1375	.....	44·6	14·1
STATION No. 71: WILLOW																		
2	Aug. 23/50....	133	.....	.....	66	..... (9·2)	..... (1·5)	9·7 (7·9)	25 (25)	6 (10)	7·6	5·2	104	72·0	0·098	.....	17·8	15·0
DATA SUPPLIED BY																		
3	Nov. 1944—Thompson River at Aschroft, B.C.							7·7	.....	.....	.....	.....	.....	78·7	.....	.....	.....	.....
4	Aug. 1940—Mountain stream near Chase, B.C.							8·0	.....	.....	.....	.....	.....	371·8	.....	.....	.....	.....
5	Nov. 1944—Coquitlam River near Port Coquitlam, B.C.							7·2	.....	.....	.....	.....	.....	42·9	.....	.....	.....	.....
6	Nov. 1944—Lytton Creek at Lytton, B.C.							6·9	.....	.....	.....	.....	.....	121·6	.....	.....	.....	.....
7	Nov. 1944—Hallecks Creek at North Bend, B.C.							8·0	.....	.....	.....	.....	.....	78·7	.....	.....	.....	.....
8	Nov. 1944—Murray and Waterfall Creeks near Spences Bridge, B.C.							8·4	.....	.....	.....	.....	.....	200·2	.....	.....	.....	.....

TABLE II—Concluded

Chemical Analyses of Surface Waters in the Fraser River Drainage Basin—Concluded

(In parts per million)

Magnesium (Mg)	Alkalis: Sodium (Na)	Alkalis: Potassium (K)	Iron (Fe): Total[a]	Iron (Fe): Dissolved	Sulphate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Silica (SiO_2): Gravimetric	Silica (SiO_2): Colorimetric	Hardness as $CaCO_3$: Non-carbonate	Hardness as $CaCO_3$: Total[b]	Sum of Constituents	Per cent sodium	Saturation index: +	Saturation index: ±	Saturation index: −	No.
NEAR BURNS LAKE																					
3·5	4·1	1·6	.....	0·30	1·6	0	2·7	.....	.....	58·6 (51·0)	0 (0)	9·4	7·2	0	49·6	70·3	14·7	.....	1·1		1
RIVER AT WILLOW RIVER																					
2·7	1·8	0·4	0·72	0·11	6·7	0	0·4	.....	.....	61·0	0	.....	7·2	0	48·5	64·3	7·4	.....	0·9		2
CANADIAN PACIFIC RAILWAYS																					
.....	.....	.....	.....	.....	8·7	5·2	.....	.....	.....	48·8	0	1·4	.....	2·9	42·9	.....	.....	.....	.....		3
.....	.....	.....	.....	.....	8·7	2·6	.....	.....	.....	139·6	0	14·3	.....	0	114·4	.....	.....	.....	.....		4
.....	.....	.....	.....	.....	5·8	0·9	.....	.....	.....	17·4	0	10·0	.....	2·9	17·2	.....	.....	.....	.....		5
.....	.....	.....	.....	.....	2·9	7·8	.....	.....	.....	87·2	0	10·0	.....	5·7	77·2	.....	.....	.....	.....		6
.....	.....	.....	.....	.....	7·7	5·2	.....	.....	.....	61·1	0	10·0	.....	0	42·9	.....	.....	.....	.....		7
.....	.....	.....	.....	.....	9·7	3·5	.....	.....	.....	189·8	5·7	10·0	.....	0	160·2	.....	.....	.....	.....		8

PART II

MUNICIPAL WATERS WITHIN THE FRASER RIVER DRAINAGE BASIN

When in 1949 survey studies were being carried out in the Columbia River basin a number of municipal water supplies within the lower Fraser River drainage basin were also studied. The remainder were sampled and field-tested in 1950 when almost the entire accessible portion of the basin was travelled with the mobile laboratory. At that time information on the operation of many of the civic water systems was also obtained. Information on others was obtained by co-operation of municipal officials or taken from the Regional Industrial Indices of British Columbia[1].

Much of the available information on all these systems is condensed below under the headings: population, ownership, source, treatment, storage capacity, water consumption and industrial use.

The chemical quality of the civic water sampled is shown in Table III. Sum of constituents and saturation index have also been reported for each water in Table III.

Appendix B lists the incorporated municipalities and other communities which are known to have organized water systems; their locations are shown in Figure 2 (in pocket) in such a manner that the water hardness of the supplies, when known, is also classified.

Table IV is a summary of the information available regarding basin area studied, total basin population and the population served with water by organized systems.

In Table V the available information on waterworks systems in the basin, such as source, treatment and hardness of the water supply is summarized.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

GREATER VANCOUVER WATER DISTRICT

Within the Fraser River delta, in an area about 20 miles wide and extending roughly 60 to 70 miles upriver, a number of incorporated cities and district municipalities have formed a Water District governed by a Board on which each member community is represented. This District Board, which includes waterworks engineers and other trained personnel, owns and operates the supply of water to the entire district but most municipalities own and operate their own distribution system. Some of the municipalities are also served by other systems and from other water sources.

In 1948, metropolitan Vancouver was considered to include 5 cities, 10 district municipalities* and 2 unorganized districts totalling 563 square miles in area. By 1950 it was expected that 370 square miles of this area would be served by the Greater Vancouver Water District[2].

This Water District is still expanding as population and industrial development in the delta area grows and other sources of supply become inadequate. In 1947, *population served* was estimated at 494,100 and in 1949 the Water District reported a population of 610,817. Comparison of the latter figure with population figures based on the 1951 census and with other data indicates close agreement in all cases except Vancouver which is some 77,840 lower by census calculation. Assuming the figures based on the ninth census to be more correct, then about 529,000 persons were served by this District in 1950-51. It is however difficult to determine exact figures owing to rapid expansion within the area and the fact that several municipalities are served with water by other sources than those of the Water District.

The *sources of supply* for the Water District are from rivers and lakes in the coastal range lying north of the Fraser River and Burrard Inlet. This protected catchment area of, eventually, some 225·7 square miles is either owned or leased by the District Board.

The main sources are:

1. Coquitlam River or Lake—capacity 400 m.g.d.
2. Seymour River with headwaters in Loch Lomond and Burwell Lake—capacity 220 m.g.d.
3. Capilano River with headwaters in Palisades Lake—capacity 200 m.g.d.

These waters flow by gravity to the various systems with no treatment, although chlorination is available on all supplies, if considered necessary owing to work being carried out in the watersheds.

---

* Incorporated district municipalities in British Columbia are somewhat similar to townships in Eastern Canada and may have within their jurisdiction several relatively large communities.

[1] Regional Index of British Columbia—Regional Development Division, Department of Trade and Industry of British Columbia, 1949 edition and 1952 edition.

[2] Water Supply to Rural Areas around Vancouver—W. H. Powell, Water and Sewage, (now Municipal Utilities) June, 1948, p. 21.

Water consumption in 1948 (371 day-period) by the Water District according to the administrative Board was as follows:

South of Burrard Inlet:			
From Capilano River	10,236·670 million gallons		
From Seymour River	7,844·455 " "		
		18,081·125 million gallons	
North of Burrard Inlet:			
From Capilano and Seymour Rivers	405·731 m.g.		
Coquitlam River	2,066·877 m.g.		
		2,472·608 " "	
Total		20,553·733 " "	
		or a daily average of 55·401 m.g.	

The north shore area[1] which is included in that portion north of Burrard Inlet is only partially served by the Greater Vancouver Water District. The portion served used in 1948, 476.858 m.g. or 1·285 m.g.d. Except for this north shore portion there is a per capita consumption of 105 gallons within the Water District. Presuming a similar per capita consumption in the north shore area then about 12,240 persons are served within this area.

Storage capacity for the Water District is considerable because the headwaters of the systems are protected lakes and rainfall on the watershed is heavy. *(See* Vancouver, B.C. page 70.)

Industrial use within the Water District is varied and quite high. (*See* below under individual communities served.)

Municipalities served in all or part by the Greater Vancouver Water District in 1950 were Vancouver, New Westminster, Port Coquitlam, Port Moody and North Vancouver, District Municipalities of North Vancouver, West Vancouver, Coquitlam, Maple Ridge, Pitt Meadows, Burnaby, Delta, Surrey, Fraser Mills and Richmond. Two unorganized areas were also served.

[1] Presumably the portions of North Vancouver City, North Vancouver District Municipality and West Vancouver District Municipality served.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

Municipality	**ABBOTSFORD**—160 acres (Incorporated as a village, Feb. 1924)			**ARMSTRONG***—1,140 acres (Incorporated as a city, 1913)			
	1941*	1949	1951*	1941	1949	1950	1951
Population served:							
In municipality	562	800	785	977	1,100	1,100	1,126
Outside municipality	.....	380	.....	.....	500	.....	.....
Total	.....	1,180	.....	.....	1,600	.....	.....
Date(s) of survey	August 24, 1950			July 28, 1949; Feb. 13, 1950			
Ownership	Municipally owned and operated			Municipally owned and operated			
Source of supply	Springs nearby			Davis (Fortune) Creek			
Treatment	No treatment; water is pumped direct from collecting reservoirs to system.			No treatment; water from dammed creek flows by gravity to reservoir and system.			
Storage capacity (thousand gallons)	Reservoirs 296 1 tank 72			1 reservoir 60 1 reservoir (1950) 160			
Consumption (average in m.g.d.)	No record			1948: 0·48 (est.) 1949: 0·48			
Industrial use	An agricultural and shopping centre; no major industrial user.			Fruit growing and farming; two packing companies, a sawmill and a supplier of compressed oxygen.			
Remarks	*Populations according to eighth and ninth census of Canada.			*Armstrong itself lies within the Columbia River drainage basin but civic water is taken from Fraser River system.			

Municipality	**BRIDGEPORT** (Unincorporated)	**BRIGHOUSE** (Unincorporated)
Population served:		
In municipality	.....	.....
Outside municipality	.....	.....
Total	.....	.....
Date(s) of survey	.....	.....
Ownership	.....	.....
Source of supply	.....	.....
Treatment	*See* Richmond District Municipality	
Storage capacity (thousand gallons)	.....	.....
Consumption (average in m.g.d.)	.....	.....
Industrial use	.....	.....
Remarks	A part of and included in data given on Richmond District Municipality.	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

ASHCROFT
(Unincorporated)

1941	1949	1951
.....	.....	1,118
.....	.....	.....
.....	850	.....

August 8, 1950
Privately owned and operated by Ashcroft Water, Electric & Improvement Co., Ltd.
Thompson River
Chlorination; water is pumped from Thompson River to ground reservoir on nearby hill; then flows by gravity to system.
Underground reservoir 135

1950

0·255 (June)

Main area activities are cattle raising, agriculture, one cannery and several smaller industries incl. a sawmill.
Chlorine demand doubles in the spring.

BEACH GROVE*
(Unincorporated)

1951

.....
.....

400†

1951
Beach Grove Water Board
No data; presumed to be wells and springs
No data
No data
No data

*Lies within Delta District Municipa'ity.
†Estimated from 100 services.

BRALORNE
(Unincorporated)

1951

1,500
.....
.....

April 20, 1951.
Owned and operated by Bralorne Mines Ltd.
Blackbird Creek, fed by mountain springs.
No treatment; water flows by gravity to reservoirs and system.
2 tanks ..... 100 total

1950

0·020 (domestic)
(201 services)
No data; a gold mining community.

BURKEVILLE
(Unincorporated)

See Richmond District Municipality

A part of and included in data given on Richmond District Municipality.

BURNS LAKE—261 acres
(Incorporated as a village, Dec. 1923)

1941	1949	1951
218	.....	801
.....	.....	.....
.....	600 (est.)	.....

September 1, 1950
Municipally owned and operated
Burns Lake
Chlorination (sodium hypochlorite); water is pumped from lake to reservoir and system.
Elevated tank 100

1949–50

0·025 (approx.)
Main industrial user is C.N.R.; also a distributing centre for cattle-raising and lumbering operations.

System installed in late 1948. Recently Burns Lake has become base of operations for the Aluminum Co. of Canada in the Kitimat area.

BURNABY—24,788 acres
(Incorporated as a District Municipality, Sept. 1892)

1941	1949	1951
30,328	.....	58,376
.....	.....	.....
.....	48,000	.....

August 9, 1949.
Municipally owned and operated.
Supplied by Greater Vancouver Water District.
See Vancouver and Greater Vancouver Water District.
3 reservoirs ..... 971·25 total
1 tank 60

1948	1949
5·7	6·0

A residential area with a highly industrialized section; sawmilling, oil-refining; furniture and box manufacture; brick making; peat-processing and iron works.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

Municipality	**BURQUITLAM** (Unincorporated)	**CANOE** (Unincorporated)
Population served:		
In municipality		
Outside municipality		
Total		
Date(s) of survey		
Ownership		
Source of supply		Part of Canoe is served with water by Salmon Arm District Municipality.
Treatment	A part of Coquitlam District Municipality	*See* Salmon Arm and Salmon Arm District Municipality.
Storage capacity (thousand gallons)		
Consumption (average in m.g.d.)		
Industrial use		
Remarks		

Municipality	**CLINTON** (Unincorporated)		**CLOVERDALE** (Unincorporated)	
	1950	1951	1948	1951
Population served:				
In municipality	.....	.....	.....	1,100
Outside municipality	.....	.....	.....	.....
Total	500 (est.)	590 (est.)	900 (est.)	.....
Date(s) of survey	August 19, 1950		1950	
Ownership	Municipally owned and operated—Clinton Waterworks District.		Cloverdale Water Co., Ltd.	
Source of supply	A mountain creek		Springs and artesian wells	
Treatment	No treatment; water flows by gravity to system.		No data. (presumably no treatment)	
Storage capacity (thousand gallons)	No data		No data	
Consumption (average in m.g.d.)	No record (80 services)		No data	
Industrial use	No major industrial user		No data	
Remarks			Cloverdale lies within the Surrey District Municipality.	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

CHASE
(Unincorporated)

1949	1951
.....	.....
.....	.....
400*	700*

1950

Privately owned by Carlin Bros. Ltd.; Chase Waterworks District.

No data

No data

No data

No data

*Estimated from number of services

CHILLIWACK—1,040 acres
(Incorporated as a city, Feb. 1908)

1941	1949	1951
3,675	5,000	5,663
.....	6,000*	.....
.....	11,000	.....

August 24, 1949

Owned and operated by the Elk Creek Waterworks Co., Ltd., Chilliwack.

Elk, Dunville and Nevin Creeks, rising in hills nearby. Famihi and Lihumitson Creeks are also available if required.

Chlorination begun late in 1949; all three creeks are screened at intakes into small wooden reservoir and the water then flows by gravity to system. Major supply is Elk Creek (2 m.g.d.)

Open reservoirs—125, 200 and 100; construction underway to increase reservoir capacity at intakes to 2 m.g. total.

1948

4·0(est.)†

Main users are a cannery (peas, vegetables, fruit) and a frozen food plant. Area is a centre of extensive agricultural and fruit-growing activity.

*Chilliwhack District Municipality

† Includes pumpage into District Municipality.

CHILLIWHACK DISTRICT MUNICIPALITY*—53,000 acres
(Incorporated)

1941	1949	1951
7,787	.....	.....
.....	.....	.....
.....	6,000	11,000

August 24, 1949..

See Chilliwack

*Includes communities of Rosedale, Sardis, Vedder Crossing and Yarrow but not all served with water. Total population in 1951—13,592.

COQUITLAM DISTRICT MUNICIPALITY
—37,204 acres*
(Incorporated)

1941	1949	1951
7,949	.....	15,697
.....	.....	.....
.....	13,000	.....

.....

.....

Supplied by Greater Vancouver Water District.

See Vancouver, B.C.

No data

No data

No data

* Includes communities of Mallardville, Burquitlam and Essondale; 23,000 acres served by Greater Vancouver Water District.

CRESCENT BEACH
(Unincorporated)

1951
.....
.....
400*

March, 1951

Privately owned and operated by Crescent Beach Waterworks Ltd.

Two artesian wells

No treatment; water is pumped from wells to reservoir and system.

1 tank 60

No record (390 services)

No major industrial user; tourism

Crescent Beach lies within the Surrey District Municipality.

* Being a seaside resort, population rises to 2,500 in summer. System is expanding rapidly.

DELTA DISTRICT MUNICIPALITY*
—80,818 acres
(Incorporated, November, 1879)

1941	1949	1951
4,287	.....	6,700
.....	.....	.....
.....	5,000	.....

August 8, 1949

Delta Municipal Waterworks. North Delta Waterworks. Beach Grove Water Board. Tswassen Water Board.

Springs and wells and from Greater Vancouver Water District.

See Vancouver and Greater Vancouver Water District, Beach Grove, etc.

Reservoir 200

1 tank 18

1948–49

0·85

Main activity in area is agriculture, peat-processing and fishing.

* Includes the communities of Beach Grove, Kennedy, Sunbury and Ladner; only 39,889 acres served by Greater Vancouver Water District.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

Municipality	EAST RICHMOND (Unincorporated)	EBURNE (Unincorporated)	ENDERBY—655 acres (Incorporated as a city, 1905)		
			1941	1949	1951
Population served:					
In municipality			538	.....	888
Outside municipality			.....	.....	.....
Total			.....	1,000	.....
Date(s) of survey			August 4, 1950		
Ownership			Municipally owned and operated		
Source of supply	A part of Richmond District Municipality and included in data given on this Municipality.		Brash Creek and a well (23 ft. deep) alongside Shuswap River.		
Treatment			No treatment: Brash Creek flows by gravity after settling in wooden tanks to system. The well water, said to be river water naturally filtered, is pumped direct to system.		
Storage capacity (thousand gallons)			Open reservoir 300		
Consumption (average in m.g.d.)			1949-50: 0·25 (est.)		
Industrial use			Main users are C.P.R., a sawmill and a creamery.		
Remarks					

Municipality	HANEY* (Unincorporated)		HARRISON HOT SPRINGS 1,678 acres (Incorporated as a village, May, 1949)	
	1949	1951	1949	1951
Population served:				
In municipality	.....	2,700	.....	477
Outside municipality	.....	.....	.....	.....
Total	2,300	.....	470	.....
Date(s) of survey	December, 1949		August, 1950	
Ownership	Municipally owned and operated		No organized system	
Source of supply	Supplied by Greater Vancouver Water District.		Privately owned wells, mountain creek and Harrison Lake.	
Treatment	*See* Vancouver and Greater Vancouver Water Board.			
Storage capacity (thousand gallons)	None			
Consumption (average in m.g.d.)	No data			
Industrial use	Mill work (sash and doors) and other smaller industries.		A summer resort with hot mineral springs	
Remarks	* Haney lies within and is included in data given on Maple Ridge District Municipality.			

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

ESSONDALE
(Unincorporated)

1949	1951
.....	.....
.....	.....
3,395	.....
December, 1949	
.....	
.....	
Essondale is a part of and included in data given on Coquitlam District Municipality.	
None	
No data	
No data	
Essondale is a provincial institution within Coquitlam District Municipality but it buys direct from Greater Vancouver Water District.	

FRASER MILLS DISTRICT MUNICIPALITY—390 acres
(Incorporated)

1941	1949	1951
552	.....	370
.....	.....	.....
.....	450 (est.)	.....
December, 1949		
Privately owned and operated by the Canadian Western Lumber Co., Ltd.		
Supplied by Greater Vancouver Water District.		
See Vancouver and Greater Vancouver Water District.		
No data		
No record: included in data given for Greater Vancouver Water District.		
Lumbering		

GOLD BRIDGE
(Unincorporated)

1949	1951
140 (est.)	150 (est.)
.....	.....
.....	.....
1948-49.	
Gold Bridge Waterworks District.	
No data.	
No data.	
No data.	
No record (38 services).	
No data.	

HOPE—1,200 acres
(Incorporated as a village, 1929)

1941	1950	1951
515	.....	1,668
.....	.....	.....
.....	3,000	.....
August 17, 1950		
Municipally owned and operated		
Schkam, Pringle and Charles Creeks, principally Schkam Creek.		
No treatment; waters flow by gravity finally from Schkam Creek to reservoir in hills and to system.		
Open natural reservoir		500
No record (480 services)		
Two sawmills; C.P.R. has its own water system.		
.....		

IOCO
(Unincorporated)

1949	1951
.....	.....
.....	.....
350 (est.)	400 (est.)
1949	
Owned and operated by Imperial Oil Ltd.	
No data	
No data	
No data	
1949	
No data (93 services)	
Oil refining and oil storage	
.....	

KAMLOOPS—912 acres
(Incorporated as a city, July ,1893)

1941	1949	1951
5,959	.....	8,099
.....	.....	.....
.....	10,500*	.....
July 29, 1949.		
Municipally owned and operated.		
South Thompson River.		
Chlorination: turbine-pumped from sump well at river to reservoirs and system.		
1 closed reservoir		1,500
1 tank		150
1948-49		
1·5† (Maximum—4·0)		
Irrigation (hop-growing, etc.) may account for 50% of total. C.P.R. shops are a large user; 3 canneries, a brewery and lumbering.		

* Probably includes North Kamloops village and district.

† Total area consumption.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

Municipality	**KENNEDY** (Unincorporated)	**LADNER** (Unincorporated)	**LILLOOET**—152 acres (Incorporated as a village, Dec. 1946)		
		1951	1941	1950	1951
Population served:					
In municipality		2,000	.....	.....	469
Outside municipality		.....	.....	.....	.....
Total		.....	.....	350*	.....
Date(s) of survey			August 18, 1950		
Ownership			Privately owned and operated by Lillooet Waterworks District.		
Source of supply			Springs and creeks†		
Treatment	Included in data on Delta District Municipality.		No treatment; springs and creeks in mountains flow to concrete reservoir then by gravity to Lillooet District Waterworks system. There is a small settling basin at the intake to the concrete reservoir.		
Storage capacity (thousand gallons)			Concrete reservoir 50		
Consumption (average in m.g.d.)			1949–50		
			No record (95 services)		
Industrial use			Irrigation is the main use. A cannery uses the railway well and Cayoos Creek. Lillooet is a divisional point on the Pacific Great Eastern Railway.		
Remarks			* Total population estimated at 600. † Also one area of town has no organized supply while another area is served by gravity from a mountain creek.		

Municipality	**MATSQUI DISTRICT MUNICIPALITY** 54,165 acres (Incorporated)		**McBRIDE**—240 acres (Incorporated as a village, 1932)		
	1941	1951	1941	1949	1951
Population served:					
In municipality	5,601*	10,308*	237	435 (est.)	490
Outside municipality	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....
Date(s) of survey	April 6, 1951 (by questionnaire)		1951		
Ownership	Privately owned and operated by Matsqui Water Co., Ltd.		Owned and operated by C.N.R.		
Source of supply	A mountain lake		Dominion Creek		
Treatment	No treatment; water enters system by gravity.		No data		
Storage capacity (thousand gallons)	No data		No data		
Consumption (average in m.g.d.)	No data		No data (148 services)		
Industrial use	No major industrial user		A divisional point on the C.N.R. and a lumbering centre.		
Remarks	* Not all served; system is limited and only a few farms in area are served (200 services).—estimated population served 900.				

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

LYTTON
(Incorporated as a village)

1941	1950	1951
.....	.....	312
.....	.....	.....
.....	600*	.....

August 9, 1950
Lytton Water Supply Company†

Lytton Creek

No treatment; water flows by gravity direct to system from tank in nearby hills.

1 tank
No record (100 services)

C.P.R.

* Probably not all served.
† C.P.R. maintains the water mains into town in return for water rights for railway use.

MAILLARDVILLE
(Unincorporated)

A part of and included in data given for Coquitlam District Municipality.

MAPLE RIDGE DISTRICT MUNICIPALITY—66,000 acres
(Incorporated)

1941	1949	1951
6,476	.....	9,891
.....	.....	.....
.....	10,000*	.....

December, 1949.
Municipally owned and operated.

Supplied by Greater Vancouver Water District.

See Vancouver and Greater Vancouver Water District.

None.

1949	1950
0·46	0·55

Some of the main activities in district are small fruit, dairy, poultry and fur farming.

* Not all served.

MERRITT—1,679 acres
(Incorporated as a city, April, 1911)

1941	1949	1951
940	.....	1,251
.....	.....	.....
.....	1,500*	.....

July 29, 1949
Municipally owned and operated

Coldwater River

Chlorination (sodium hypochlorite solution); water enters underground filtration gallery and is then pumped to reservoir and system.
1 elevated tank 250

1948
0·25 (est.)

Main activities in area are cattle raising and lumbering. C.P.R. also uses civic water.

* Total population—2,000

MISSION CITY—821 acres
(Incorporated as a village, Dec. 1922)

1941	1949	1951
1,957	3,090	2,668
.....	810*	.....
.....	3,900	.....

August 23, 1949
Municipally owned and operated

Cannell Lake, Cedar Valley springs and Silverdale Creek; principally Cannell Lake.
No treatment; water flows by gravity from all sources to system. The springs and lake supply the higher portion of town.
Open reservoir at springs 175
Open dam reservoir at creek 1,000
Cannell Lake ..... 22,324,000 acre-ft.

1948	
In municipality	0·386
Outside municipality	0·103
Total	0·489

This is an important retail and wholesale distributing centre; canning, fruit and milk processing, sawmilling and manufacture of matches.

* Probably in Mission District Municipality...

MISSION DISTRICT MUNICIPALITY
73,000 acres
(Incorporated)

1941	1949	1951
2,718	.....	4,449*
.....	.....	.....
.....	810†	.....

August 23, 1949.

A portion of District is supplied by Mission City Waterworks.
See Mission City.

See Mission City.

1948
0·103

See Mission City.

*Not all served.
† Based on data supplied by Mission City Waterworks' officials in 1949.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

	NEWTON STATION (Unincorporated)	NEW WESTMINSTER—4,394 acres (Incorporated as a city, July, 1860)
Municipality		
Population served:		1941 / 1949 / 1951
In municipality		21,967 / ..... / 27,789
Outside municipality		..... / ..... / 850
Total		..... / 34,000 / 28,639
Date(s) of survey		December, 1949
Ownership		Municipally owned and operated
Source of supply	A part of and included in data given for Surrey District Municipality.	Supplied by the Greater Vancouver Water District mostly from Seymour River and Coquitlam Lake.
Treatment		*See* Vancouver and Greater Vancouver Water District.
Storage capacity (thousand gallons)		1 reservoir ..... 6,900 1 reservoir 2,300
Consumption (average in m.g.d.)		1949 5·0
Industrial use		This is a distributing centre for products of Fraser River valley and has diversified industries including salmon-canning, lumbering, machinery manufacture and meat-packing.
Remarks		

	PITT MEADOWS DISTRICT MUNICIPALITY—12,000 acres (Incorporated)	PORT MANN (Unincorporated)
Municipality		
Population served:	1941 / 1949 / 1951	
In municipality	1,119 / ..... / 1,434	
Outside municipality	..... / ..... /	
Total	..... / 840 /	
Date(s) of survey	1949–50	
Ownership	Municipally owned and operated	
Source of supply	Supplied by Greater Vancouver Water District, mostly from Coquitlam Lake.	Included in and part of Surrey District Municipality.
Treatment	*See* Vancouver and Greater Vancouver Water District.	
Storage capacity (thousand gallons)	None	
Consumption (average in m.g.d.)	1949 0·14	
Industrial use	Area activity is primarily agriculture and lumbering; some manufacturing.	
Remarks		

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

NORTH KAMLOOPS
(Incorporated)

1941	1949	1951
.....	.....	1,979
.....	.....	.....
.....	2,000	.....

July 29, 1949.....
Municipally owned and operated.....
Supplied by Kamloops Municipal Waterworks...

See Kamloops, B.C.....

.....

NORTH VANCOUVER—3,131 acres
(Incorporated as a city, March, 1906)

1941	1949	1951
8,914	.....	15,687
.....	.....	.....
.....	11,000	.....

August 9, 1949.....
Municipally owned and operated.....
Lynn Creek, 4 miles distant; also from Greater Vancouver Water District.

Lynn Creek is used directly with no treatment. *See* also Greater Vancouver Water District and Vancouver.
Rice Lake.....30,000

1948-49	1950
3·0	3·5

Fishing and lumbering with a substantial ship building industry; a highly industrialized area.

.....

NORTH VANCOUVER DISTRICT MUNICIPALITY*—40,818 acres†
(Incorporated)

1941	1949	1951
5,931	.....	14,469
....	.....	.....
.....	11,000	.....

1949.
Municipally owned and operated.
Lynn, Mosquito and Kilmer Creeks; Kennedy Lake: supplied also by Greater Vancouver Water District.
No treatment except chlorination on certain creek waters: waters enter system by gravity: some booster pumping.
No data.....

1949	1950
0·28	0·38

A highly industrialized area. *See* North Vancouver.

* Includes communities of Capilano, Caulfield, Deep Cove, Dollarton and Lynn Creek.
† 11,800 acres served by Greater Vancouver Water District.

PORT COQUITLAM—6,200 acres
(Incorporated as a city, March 1913)

1941	1949	1951
1,539	.....	3,232
.....	.....	.....
.....	2,500	.....

August 9, 1949.....
Municipally owned and operated.....
Supplied by Greater Vancouver Water District.

See Vancouver and Greater Vancouver Water District.

None.....

1949
0·50 (approx.)

Freight terminus of C.P.R.; lumbering; rubber manufacturing and fruit farming.

.....

PORT MOODY—2,980 acres*
(Incorporated as a city, March, 1913)

1941	1949	1951
1,512	.....	2,246
.....	.....	.....
.....	2,500	.....

August 9, 1949.....
Municipally owned and operated.....
Supplied by Greater Vancouver Water District.

See Vancouver and Greater Vancouver Water District.

1 reservoir.....1,000

1949
0·75 (approx.)

Main activities are sawmilling, lumbering and oil-refining.

* Only about 1,980 acres served by Greater Vancouver Water District.

PRINCE GEORGE—1,092 acres
(Incorporated as a city, March, 1915)

1941	1950	1951
2,027	4,500*	4,703
.....	.....	.....
.....	.....	.....

August 24, 1950.
Municipally owned and operated.
Nechako River.

Chlorination and natural filtration, from river above town through 300 ft. of gravel into 20 ft. well then pumped to reservoir on hill, or river water may be pumped direct. Standby source is gravel well, 20 ft. from river.
1 elevated tank (open)..... 100
A 3 m.g. open reservoir is planned.

1949-50
0·65 (est.)

Main users are sawmills, a dairy, and a roofing company. Prince George is a main distributing centre.

* Total district population—10,000.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

Municipality	**VANCOUVER**—27,965 acres (Incorporated as a city, April, 1886)	**VEDDER CROSSING** (Unincorporated)
Population served:	1941 / 1949 / 1951	No data
In municipality	275,353 / 421,471 / 342,728	
Outside municipality	..... / 1,200* / 2,105*	
Total	..... / 422,671† / 344,833	
Date(s) of survey	August 9, 1949	
Ownership	Municipally owned and operated	A part of Chilliwhack District Municipality.
Source of supply	Supplied by the Greater Vancouver Water District from Capilano River, Seymour Lake and Coquitlam Lake. The city is supplied mainly from the first two sources.	A portion of population including a federal defence installation are supplied with water from Chilliwack River which is not treated except for chlorination. *See* Table II, Station No. 22.
Treatment	No treatment; water from behind a dam on the Capilano River at Palisades Lake is piped, after screening, by gravity to system. Similarly at dams at Burwell Lake and Loch Lomond, Seymour River water is piped by gravity to system. Coquitlam Lake is also piped by gravity to various portions of Greater Vancouver Water District system.	
Storage capacity (thousand gallons)	Tank ..... 750 Palisade Lake (Capilano River)...16,000 acre ft. Loch Lomond, Seymour River, (Burwell Lake) ..... 5,400 acre ft. Coquitlam Lake .....12,000 acre ft. Total capacity .....33,400 acre ft.	
Consumption (average in m.g.d.)	1948 43·0 (approx.)	.....
Industrial use	Many types of industry located in this area; but many of the larger are outside the city proper.	
Remarks	Chlorination available on all supplies if required. * University Endowment Lands. † Data supplied by Greater Vancouver Water District.	

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

	WALHACHIN (Unincorporated)	**WELLS** (Unincorporated)	**WEST VANCOUVER DISTRICT MUNICIPALITY**—20,515 acres.* (Incorporated)		
	1948	1951	1941	1949	1951
Population	.....	.....	7,669	.....	13,990
Number of services	.....	.....	.....	.....	.....
Number of consumers	60 (est.)	1,000	.....	11,000	.....
Year of construction	1948–49	January, 1951	August 9, 1949.		
Source of supply	Walhachin Water District	Privately owned, and operated by the Cariboo Gold Quartz Mining Co., Ltd.; (Wells Townsite Co., Ltd.)	Municipally owned and operated.		
Auxiliary supply	No data	Mosquito Creek and Red Gulch Creek. Jack of Clubs Lake is used for fire protection if necessary.	Supplied from Greater Vancouver Water District. Only partly served.		
Treatment	No data	No treatment; creek waters enter reservoirs and system by gravity.	*See* Vancouver and Greater Vancouver Water District.		
Storage	No data	2 tanks in town, each ..... 6 1 tank at the mine 30	2 tanks, each ..... 100 Eagle Lake 33,000		
Average consumption, gallons per capita per day	No data (13 services)	1950 Domestic ..... 0·030 Industrial ..... 0·025 Total ..... 0·055	1949 1·5		
Remarks	No data	Only industrial user is the Cariboo Gold Quartz Mining Co., Ltd.	Mainly a residential community.		

* In 1950 about 7,680 acres served by Greater Vancouver Water District.

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

	WHALLEY (Unincorporated)	WHITE ROCK* (Unincorporated)
Municipality		
Population served:		1949
In municipality		6,000†
Outside municipality		.....
Total		.....
		Population rises in summer to 10,000–15,000. Week-end summer population may rise to 40,000.
Date(s) of survey		March 1, 1950
Ownership	A part of	Privately owned and operated by White Rock Waterworks Co., Ltd.
Source of supply	and included in	Graeine spring and three flowing wells.
Treatment	Surrey	No treatment; water is pumped to reservoirs and system. Civic supply is mixture of various sources.
Storage capacity (thousand gallons)	District Municipality	3 elevated tanks.....20, 50 and 50 2 ground reservoirs.....42 and 120 Total..... 282
Consumption (average in m.g.d.)		1949 0·22 (Maximum—0·68)
Industrial use		Mainly a tourist resort
Remarks		* A part of Surrey District Municipality. † A bulk supply of water is also supplied to 300 services in the Sunnyside area of the District.

	WILLIAMS LAKE—324 acres (Incorporated as a village, March 1929)		
Municipality			
Population served:	1941	1950	1951
In municipality	540	.....	913
Outside municipality	.....	.....	.....
Total	.....	1,200	.....
Date(s) of survey	August 21, 1950.		
Ownership	Municipally owned and operated.		
Source of supply	Williams Lake.		
Treatment	Chlorination (sodium hypochlorite); water is pumped from near shore to reservoir and system.		
Storage capacity (thousand gallons)	1 elevated tank..... 85 Pacific Great Eastern Railway..... 60		
Consumption (average in m.g.d.)	1949 0·80		
Industrial use	Main user is Pacific Great Eastern Railway. Main area activity is cattle raising.		
Remarks	.....		

DESCRIPTION OF MUNICIPAL WATERWORKS SYSTEMS

(Fraser River Drainage Basin)

BRITISH COLUMBIA

	WHALLEY (Unincorporated)	WHITE ROCK* (Unincorporated)
Municipality		
Population served:		1949
In municipality		6,000†
Outside municipality		.....
Total		.....
		Population rises in summer to 10,000–15,000. Week-end summer population may rise to 40,000.
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Remarks		* A part of Surrey District Municipality. † A bulk supply of water is also supplied to 300 services in the Sunnyside area of the District.

	WILLIAMS LAKE—324 acres (Incorporated as a village, March 1929)		
Municipality			
Population served:	1941	1950	1951
In municipality	540	.....	913
Outside municipality	.....	.....	.....
Total	.....	1,200	.....
Date(s) of survey	August 21, 1950.		
Ownership	Municipally owned and operated.		
Source of supply	Williams Lake.		
Treatment	Chlorination (sodium hypochlorite); water is pumped from near shore to reservoir and system.		
Storage capacity (thousand gallons)	1 elevated tank..... 85 Pacific Great Eastern Railway..... 60		
Consumption (average in m.g.d.)	1949 0·80		
Industrial use	Main user is Pacific Great Eastern Railway.		
Remarks	Main area activity is cattle raising.		

TABLE III

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

No.	Municipality	Abbotsford	Armstrong	Ashcroft	Beach Grove	Bralorne	Bridgeport / Brighouse / Burkeville
	Source(s)	Springs	Fortune Creek	Thompson River	Springs and wells	Blackbird Creek	Supplied by Richmond District Municipality
		Raw and finished water	Raw and finished water	Raw and finished water		Raw and finished water	
	Sampling point	Town tap	Town tap	Direct from river			
1	Laboratory number	3520	3489	4619			
2	Field number	505	466	706			
3	Date of collection	Aug. 24/49	July 28/49	Aug. 8/50			
4	Storage period (days)	68	82	84			
5	Sampling temperature, °C.	17·0	.....	16·7			
6	Test temperature, °C.	20·5	22·0	26·2			
7	Dissolved oxygen	.....	.....	.....			
8	Carbon dioxide (CO_2)	.....(1·2)	.....(3·0)	.....(2·0)			
9	pH	7·6 (7·5)	8·1 (8·3)	7·8 (8·0)			
10	Colour	5 (5)	0 (5)	8 (6)			
11	Turbidity	2	0·5	5·5 (5)			
12	Suspended matter, dried at 105°C.	.....	.....	.....			
13	Suspended matter, ignited at 550°C.	.....	.....	.....			
14	Residue on evaporation, dried at 105°C.	91·8	124	.....			
15	Ignition loss at 550°C.	32·8	6·4	.....	No data; presumed to be similar to wells at Crescent Beach and White Rock, B.C.	No data.	*See* Richmond District Municipality.
16	Specific conductance (micromhos at 25°C.)	107	180	86·5			
17	Calcium (Ca)	12·5	32·6	11·5			
18	Magnesium (Mg)	3·0	2·3	1·6			
19	Iron (Fe) Total	.....	.....	.....			
20	Dissolved	0·09	0·08	.....			
21	Sodium (Na)	3·7	1·6	1·8			
22	Potassium (K)	0·4	1·6	0·8			
23	Carbonate (CO_3)	0 (0)	0 (0)	0			
24	Bicarbonate (HCO_3)	43·9 (43·9)	97·6 (97·6)	41·7			
25	Sulphate (SO_4)	5·4	16·5	5·8			
26	Chloride (Cl)	5·8 (6·0)	0 (0)	0			
27	Fluoride (F)	0	0	.....		0·1 p.p.m.† (1952)	
28	Nitrate (NO_3)	15·9	Trace	.....			
29	Silica (SiO_2) Gravimetric	15	8·8	.....			
30	Colorimetric	17	11·2	4·2			
31	Carbonate hardness as $CaCO_3$, p.p.m.	36·0	80·0	34·2 (32·0)			
32	Non-carbonate hardness as $CaCO_3$, p.p.m.	7·6	10·8	1·1 (5·0)			
33	Total hardness as $CaCO_3$, p.p.m.	43·6	90·8	35·3 (37·0)			
34	Sum of Constituents	85·4	114	46·2			
35	Saturation index	−1·2	+0·06	−0·9			
	Remarks:	Note rather high nitrate content.			Beach Grove lies within Delta District Municipality.	†Analysis supplied by Department of National Health and Welfare.	Communities lying in and part of the Richmond District Municipality.

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

Burns Lake	Burnaby / Burquitlam	Canoe	Chilliwack			Chilliwack District Municipality	Clinton	No.
Burns Lake	Supplied by Greater Vancouver Water District	East Canoe Creek; supplied by Salmon Arm Waterworks.	Elk River	Nevin Creek	Dunville Creek	Chilliwack Waterworks	A mountain creek	
Raw and finished water			Raw and finished water				Raw and finished water	
Direct from lake			At intake	At intake	At intake		Town tap	
4813			3437	3521	3436		4567	1
764			510	509	508		728	2
Sept. 1/50			Aug. 25/49	Aug. 25/49	Aug. 25/49		Aug. 19/50	3
136			34	67	34		53	4
15·0			11·0	9·0	9·5		12·2	5
16·8			21·0	20·7	21·0		21·0	6
..... (9·2)			.....	.....	.....		.....	7
..... (4·0)			..... (1·2)	.....	..... (3·0)		.....	8
7·5 (7·5)			8·1 (8·4)	8·1 (8·4)	8·0 (8·4)		8·2 (8·2)	9
35 (60)			3 (5)	5 (5)	3 (5)		3 (15)	10
2·5			0·3	0·7	0·5		0·7 (clear)	11
.....			.....	.....	.....		.....	12
.....			.....	.....	.....		.....	13
101			154	158	188		236	14
44·6			24·6	28·0	33·8		27·4	15
108			238	243	285		377	16
14·1	*See* Vancouver, B.C.	*See* Salmon Arm and Salmon Arm District Municipality.	41·3	45·8	52·8	*See* Chilliwack, B.C.	51·9	17
3·5			3·0	4·0	3·8		17·5	18
.....			0·04	.....	.....		.....	19
0·30			.....	0·05	0·11		0·08	20
4·1			3·3	2·3	3·7		5·6	21
1·6			0·4	0·3	0·6		1·1	22
0 (0)			2·4 (0)	2·2 (0)	2·8 (0)		4·8 (7·2)	23
71·5 (62·2)			90·3 (95·2)	127 (129)	132 (140)		252 (239)	24
1·6			39·5	28·0	40·2		11·7	25
0			1·6	0·8 (0)	2·1		0 (0)	26
.....			0·05	0	0		0·1	27
2·7			1·2	2·2	3·5		0	28
9·4			6·6	4·8	6·0		.....	29
7·2			10·9	7·4	9·7		20	30
49·6			78·0 (78·0)	104 (106)	113 (115)		202 (208)	31
0			37·3	26·8	34·3		0 (4·0)	32
49·6			115	131	147		202 (212)	33
70·3			148	155	185		237	34
−1·1			+0·1	+0·3	+0·3		+0·7	35

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

No.	Municipality	Cloverdale	Coquitlam District Municipality	Crescent Beach		Delta District Municipality	East Richmond / Eburne
	Source(s)	Springs and artesian wells	Supplied from Greater Vancouver Water District	Artesian wells		Supplied from Greater Vancouver Water District and from springs and wells.	Supplied from Greater Vancouver Water District
				Raw and finished water			
	Sampling Point			Well No. 1	Well No. 2		
1	Laboratory number			5026	5025		
2	Field number			811	810		
3	Date of collection			Apr. 30/51	Mar. 17/51		
4	Storage period (days)			30	44		
5	Sampling temperature, °C			4·4	5·6		
6	Test temperature, °C			22·8	22·8		
7	Dissolved oxygen			.....	.....		
8	Carbon dioxide (CO_2)			.....	.....		
9	pH			7·8	8·0		
10	Colour			2	0		
11	Turbidity			6	0·5		
12	Suspended matter, dried at 105°C			1·7	.....		
13	Suspended matter, ignited at 550°C			0·9	.....		
14	Residue on evaporation, dried at 105°C			125	130		
15	Ignition loss at 550°C			22·8	21·8		
16	Specific conductance (micromhos at 25°C.)	No data.	*See* Vancouver, B.C.	182	193	*See* Vancouver, B C. and Beach Grove, B.C.	*See* Richmond District Municipality, B.C.
17	Calcium (Ca)			16·9	17·8		
18	Magnesium (Mg)			6·7	7·2		
19	Iron (Fe) Total			0·26	.....		
20	Dissolved			0·03	0·04		
21	Sodium (Na)			13·0	10·3		
22	Potassium (K)			2·0	2·1		
23	Carbonate (CO_3)			0	0		
24	Bicarbonate (HCO_3)			91·0	99·6		
25	Sulphate (SO_4)			7·0	6·0		
26	Chloride (Cl)			10·3	10·7		
27	Fluoride (F)	1·2† (1952)		0	0		
28	Nitrate (NO_3)			0	0·4		
29	Silica (SiO_2) Gravimetric			.....	.....		
30	Colorimetric			23	20		
31	Carbonate hardness as $CaCO_3$, p.p.m.			69·7	74·0		
32	Non-carbonate hardness as $CaCO_3$, p.p.m.			0	0		
33	Total hardness as $CaCO_3$, p.p.m.			69·7	74·0		
34	Sum of Constituents			124	124		
35	Saturation index			−0·6	−0·3		
	Remarks:	Cloverdale lies within Surrey District Municipality, B.C. †Analyses supplied by Dept. of National Health and Welfare.					

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

Enderby		Essondale	Fraser Mills District Municipality	Greater Vancouver Water District	Haney	Harrison Hot Springs*	Hope		No.
Brash Creek	Well	Supplied from Greater Vancouver Water District through Coquitlam District Municipality.	Supplied from Greater Vancouver Water District	Capilano, Coquitlam and Seymour Rivers	Supplied from Greater Vancouver Water District through Maple Ridge District Municipality	Mineral hot spring	Schkam Creek		
Raw and finished water				Raw and finished water			Raw and finished water		
Town tap	At pump			Direct from rivers		Direct from spring	Town tap	Town tap	
4485	4543					4808	3532	4599	1
692	694					721	513	723	2
Aug. 4/50	Aug. 4/50					Aug. 17/50	Aug. 26/49	Aug. 17/50	3
27	52					151	68	69	4
15·6	.....					>60	.....	19·7	5
25·5 (18·9)	25·5					21·5	19·0	20·5 (22·5)	6
.....	.....					.....	.....	.....	7
..... (3·0)	..... (40)					.....	..... (3·0)	..... (3·0)	8
7·7 (7·8)	7·4 (7·1)					8·0	7·5 (7·9)	7·2 (7·4)	9
10 (5)	10					5	5 (5)	3 (<5)	10
1	25 (25)					0·2	0·4	0	11
.....	81					.....	.....	.....	12
.....	78					.....	.....	.....	13
90·0	457					1358	48·4	42·6	14
8·8	82·0					38·6	7·4	5·4	15
135	725	*See* Vancouver, B.C.	*See* Vancouver, B.C.	*See* Vancouver, B.C.	*See* Vancouver, B.C.	1965	69·8	67·5	16
20·4	49·5					83·0	11·6	8·6	17
2·9	41·9					0	2·3	1·7	18
.....	4·25					.....	.....	.....	19
0·04	0·10					0·03	0·03	0·05	20
2·6	50·0					355	1·8	1·2	21
1·2	2·9					15·0	1·0	0·8	22
0 (0)	0 (0)					2·4	0 (0)	0 (0)	23
72·0 (70·8)	383 (381)					17·1	39·6 (41·5)	37·3 (35·4)	24
9·2	67·7					516	11·9	4·6	25
0	16·5					283	0	0 (0)	26
0·15	1·0					3·0	0·05	0	27
0	2·7					0	0	<0·4	28
.....	.....					55	5·0	5·4	29
6·4	28					64	7·6	7·0	30
59·0 (58·0)	296 (298)					18·0	32·4 (34·0)	28·5 (29·0)	31
3·8 (3·0)	0 (0)					189	6·0	0 (0)	32
62·8 (61·0)	296 (298)					207	38·4	28·5 (29·0)	33
78·4	449					1330	55·8	42·7	34
−0·6	+0·1					−0·4	−1·4	−1·8	35
Fluoride 0·25 p.p.m. (1948); analysis supplied by Dept. of National Health and Welfare.	H_2S present.					*No organized civic supply.			

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TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

No.	Municipality	Kamloops		Kennedy / Ladner	Lillooet	Lytton	Maillardville
	Source(s)	South Thompson River		Supplied from Greater Vancouver Water District through Delta District Municipality	Springs and creeks	Lytton Creek	Supplied from Greater Vancouver Water District through Coquitlam District Municipality
		Raw and finished water			Raw and finished water	Raw and finished water	
	Sampling Point	Tap at waterworks plant	Town tap		Town tap	Town tap	
1	Laboratory number	3490	4596		4601	4600	
2	Field number	467	703		726	724	
3	Date of collection	July 29/49	Aug. 8/50		Aug. 18/50	Aug. 18/50	
4	Storage period (days)	81	78		68	68	
5	Sampling temperature, °C.	19·0	16·7		.....	15·5	
6	Test temperature, °C.	22·0	26·2 (25·6)		22·0 (25·3)	21·9 (19·3)	
7	Dissolved oxygen	.....	.....		.....	.....	
8	Carbon dioxide (CO_2)	.....	.....		.....	..... (3·0)	
9	pH	7·6 (7·9)	7·5 (7·8)		8·1 (8·4)	7·6 (7·8)	
10	Colour	7 (6)	10 (5)		2 (<5)	2 (<5)	
11	Turbidity	0·2	0·4 (<5)		0·3	0·2	
12	Suspended matter, dried at 105°C.	.....	.....		.....	.....	
13	Suspended matter, ignited at 550°C.	.....	.....		.....	.....	
14	Residue on evaporation, dried at 105°C.	59·4	52·6		216	87·6	
15	Ignition loss at 550°C.	8·2	8·4		19·8	5·4	
16	Specific conductance (micromhos at 25°C.)	80·5	82·0		347	132	
17	Calcium (Ca)	12·0	11·6	*See* Vancouver, B.C.	48·5	22·3	*See* Vancouver, B.C.
18	Magnesium (Mg)	2·1	1·1		19·5	1·6	
19	Iron (Fe) Total	.....	.....		.....	.....	
20	Dissolved	0·08	0·12		0·04	0·03	
21	Sodium (Na)	1·3	1·4		5·1	2·6	
22	Potassium (K)	0·6	0·7		0·4	0·2	
23	Carbonate (CO_3)	0 (0)	0 (0)		9·6 (0)	0 (0)	
24	Bicarbonate (HCO_3)	40·3 (39·1)	40·5 (41·5)		203 (210)	79·3 (78·1)	
25	Sulphate (SO_4)	7·4	7·1		28·0	5·3	
26	Chloride (Cl)	0 (0)	0		0 (0)	0 (0)	
27	Fluoride (F)	0·10	0·05		0·05	0	
28	Nitrate (NO_3)	0·35	0		0	0	
29	Silica (SiO_2) Gravimetric	5·2	6·8		9·6	12	
30	Colorimetric	7·6	6·6		9·4	14	
31	Carbonate hardness as $CaCO_3$, p.p.m.	33·0 (32·0)	33·2 (34·0)		179 (172)	62·2 (64·0)	
32	Non-carbonate hardness as $CaCO_3$, p.p.m.	5·5	0·2 (1·0)		22·2 (30·0)	0 (1·0)	
33	Total hardness as $CaCO_3$, p.p.m.	38·5	33·4 (35·0)		201 (202)	62·2 (65·0)	
34	Sum of Constituents	51·4	48·6		221	84·9	
35	Saturation index	−1·2	−1·2		+0·6	−0·7	
	Remarks:	Fluoride — 0·07 p.p.m. (1948); analysis supplied by Dept. of National Health and Welfare.					

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

Maple Ridge District Municipality	Matsqui District Municipality	McBride	Merritt	Mission City			Mission District Municipality	No.
Supplied from Greater Vancouver Water District	A mountain lake	Dominion Creek	Coldwater River	Cannell Lake	Silverdale Creek	Cedar Valley Springs	Supplied by Mission City Waterworks	
			Raw and finished water	Raw and finished water				
			Town tap	Town tap	At intake	Direct from springs		
			3491	3530	3528	3529		1
			469	504	502	503		2
			July 29/49	Aug. 23/49	Aug. 23/49	Aug. 23/49		3
			81	71	71	71		4
			5·0	17·8	13·0	13·5		5
			22·0 (21·8)	19·0	19·5	19·5		6
			.....	.....	.....	.....		7
			..... (5·0)	..... (8·5)	..... (4·0)	..... (3·9)		8
			7·5 (7·5)	7·1 (6·4)	7·3 (7·3)	7·3 (7·5)		9
			0 (5)	10 (10)	15 (25)	5 (8)		10
			4	0·4	3	0·3		11
			2·0	.....	.....	.....		12
			1·0	.....	.....	.....		13
			80·6	20·6	47·6	73·0		14
			7·8	8·6	13·0	16·0		15
			113	27·7	42·7	76·2		16
See Vancouver, B.C.	No data.	No data.	17·0	3·8	7·8	11·2	*See* Mission City.	17
			3·4	0·4	0·8	2·4		18
			0·08	.....	.....	.....		19
			0·04	0·05	0·21	0·03		20
			2·9	1·1	2·4	3·3		21
			0·6	0·1	0·5	0·4		22
			0 (0)	0 (0)	0 (0)	0 (0)		23
			67·1 (69·5)	9·4 (11·0)	24·4 (23·2)	36·6 (39·1)		24
			6·3	6·6	9·1	7·9		25
			0·1 (0)	0 (0)	0	1·5		26
			0·05	0	.....	0·10		27
			Trace	0	0·7	8·0		28
			8·2	3·4	9·4	14		29
			10	4·2	11·8	20		30
			55·0	7·7 (9·0)	20·0 (19·0)	30·0 (32·0)		31
			1·4	3·4	2·8	7·8		32
			56·4	11·1	22·8	37·8		33
			73·6	20·9	45·3	72·8		34
			−1·0	−2·9	−2·0	−1·7		35
		Fluoride 0·10 p.p.m. (1948); analysis supplied by Dept. of National Health and Welfare.						

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

No.	Municipality	Newton Station	New Westminster	North Kamloops	North Vancouver		North Vancouver District Municipality
	Source(s)	Supplied from Greater Vancouver Water District through Surrey District Municipality	Supplied from Greater Vancouver Water District	Supplied by Kamloops Municipal Waterworks	Lynn River	Supplied from Greater Vancouver Water District	Supplied from Greater Vancouver Water District and North Vancouver city
					Raw and finished water		
	Sampling Point				Direct from river		
1	Laboratory number				3439		
2	Field number				476		
3	Date of collection				Aug. 10/49		
4	Storage period (days)				49		
5	Sampling temperature, °C				17·0		
6	Test temperature, °C				21·0 (19·0)		
7	Dissolved oxygen				.....		
8	Carbon dioxide (CO_2)				.....		
9	pH				7·2 (7·3)		
10	Colour				3 (5)		
11	Turbidity				0·3 (clear)		
12	Suspended matter, dried at 105°C				.....		
13	Suspended matter, ignited at 550°C				.....		
14	Residue on evaporation, dried at 105°C				18·8		
15	Ignition loss at 550°C				6·6		
16	Specific conductance (micromhos at 25°C.)				21·8		
17	Calcium (Ca)	*See* Vancouver, B.C.	*See* Vancouver, B.C.	*See* Kamloops, B.C.	2·8	*See* Vancouver, B.C.	*See* Vancouver, B.C. and North Vancouver, B.C.
18	Magnesium (Mg)				0·9		
19	Iron (Fe) Total				.....		
20	Dissolved				0·02		
21	Sodium (Na)				1·3		
22	Potassium (K)				0·3		
23	Carbonate (CO_3)				0 (0)		
24	Bicarbonate (HCO_3)				11·6 (7·3)		
25	Sulphate (SO_4)				2·6		
26	Chloride (Cl)				1·6		
27	Fluoride (F)				0		
28	Nitrate (NO_3)				0·8		
29	Silica (SiO_2) Gravimetric				.....		
30	Colorimetric				5·8		
31	Carbonate hardness as $CaCO_3$, p.p.m.				9·5 (6·0)		
32	Non-carbonate hardness as $CaCO_3$, p.p.m.				1·2		
33	Total hardness as $CaCO_3$, p.p.m.				10·7		
34	Sum of Constituents				21·8		
35	Saturation index				−2·8		
	Remarks:	Newton Station is a part of and included in Surrey District Municipality.			Fluoride—0·05 p.p.m. (1949); analysis supplied by Dept. of National Health and Welfare.		

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

Pitt Meadows District Municipality	Port Mann	Port Coquitlam	Port Moody	Prince George		Quesnel	No.
Supplied from Greater Vancouver Water District, mostly from Coquitlam River	Included in Surrey District Municipality and supplied from Greater Vancouver Water District	Supplied from Greater Vancouver Water District	Supplied from Greater Vancouver Water District	Nechako River		Quesnel River	
				Raw and finished water		Raw and finished water	
				Plant tap	From sump well, after natural filtration	Town tap	
				4570	4569	4785	1
				741	740	737	2
				Aug. 24/50	Aug. 24/50	Aug. 22/50	3
				48	48	134	4
				17·5	14·2	16·2	5
				21·0 (22·2)	16·7 (16·3)	21·0 (21·9)	6
				.....	.....	.....	7
				..... (13·0)	..... (15·0)	..... (7·0)	8
				7·5 (7·2)	7·9 (7·4)	7·5 (7·7)	9
				7 (5)	2 (10)	5	10
				2	2	7	11
				.....	.....	110	12
				.....	.....	8·5	13
				144	259	108	14
				13·6	14·6	38·8	15
				225	382	170	16
See Vancouver, B.C.	*See* Vancouver, B.C.	*See* Vancouver, B.C.	*See* Vancouver, B.C.	31·2	58·0	27·4	17
				8·1	15·9	3·6	18
				.....	.....	0·16	19
				0·12	0·32	0·03	20
				3·3	4·2	2·8	21
				1·4	2·4	0·6	22
				0 (0)	0 (0)	0	23
				135 (132)	244 (234)	92·7	24
				11·0	25·8	12·7	25
				0 (0)	0 (0)	0 (0)	26
				0·05	0·05	0·10	27
				0	0	2·7	28
				.....	.....	.....	29
				12	27	5·7	30
				111 (108)	200 (192)	76·0	31
				0·1 (14·0)	10·5 (26·0)	7·2	32
				111 (122)	211 (218)	83·2	33
				134	254	101	34
				−0·5	0·4	−0·7	35
				Mn=0·1 p.p.m.	Mn=0·9 p.p.m.	Al=0 p.p.m.	

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

No.	Municipality	Rosedale	Richmond District Municipality	Salmon Arm		Salmon Arm District Municipality	Sardis	South Westminster
	Source(s)	Supplied by Chilliwhack District Municipality	Supplied from Greater Vancouver Water District	Shuswap Lake / East Canoe Creek — Raw and finished water		Mostly East Canoe Creek from Salmon Arm Waterworks	Supplied by Chilliwhack District Municipality	Supplied by Surrey District Municipality from Greater Vancouver Water District
	Sampling Point			Town tap	From reservoir intake			
1	Laboratory number			4566	4565			
2	Field number			696	695			
3	Date of collection			Aug. 5/50	Aug. 5/50			
4	Storage period (days)			67	67			
5	Sampling temperature, °C			16·5	15·0			
6	Test temperature, °C			25·5 (21·7)	25·5 (22·2)			
7	Dissolved oxygen			.....	.....			
8	Carbon dioxide (CO_2)			..... (0)	..... (3)			
9	pH			8·1 (8·5)	8·0 (7·9)			
10	Colour			7 (10)	5 (5)			
11	Turbidity			6 (8)	0·7			
12	Suspended matter, dried at 105°C			7·6	.....			
13	Suspended matter, ignited at 550°C			5·2	.....			
14	Residue on evaporation, dried at 105°C			82·8	213			
15	Ignition loss at 550°C			11·0	9·8			
16	Specific conductance (micromhos at 25°C.)	*See*	*See*	128	362	*See*	*See*	*See*
17	Calcium (Ca)	Chilliwack,	Vancouver,	24·6	67·7	Salmon Arm,	Chilliwack,	Vancouver,
18	Magnesium (Mg)	B.C.	B.C.	3·0	7·0	B.C.	B.C.	B.C.
19	Iron (Fe) Total			0·42	.....			
20	Dissolved			0·07	0·06			
21	Sodium (Na)			2·7	2·7			
22	Potassium (K)			1·1	1·5			
23	Carbonate (CO_3)			0 (4·8)	0 (0)			
24	Bicarbonate (HCO_3)			67·1 (61·1)	217 (210)			
25	Sulphate (SO_4)			9·7	20·9			
26	Chloride (Cl)			0	0			
27	Fluoride (F)			0·1	0·05			
28	Nitrate (NO_3)			0·3	0			
29	Silica (SiO_2) Gravimetric			.....	.....			
30	Colorimetric			9·3	18			
31	Carbonate hardness as $CaCO_3$, p.p.m.			55·0	178			
32	Non-carbonate hardness as $CaCO_3$, p.p.m.			18·7	19·7			
33	Total hardness as $CaCO_3$, p.p.m.			73·7	198			
34	Sum of Constituents			84·0	225			
35	Saturation index			−0·15	+0·7			
	Remarks:							

TABLE III—Continued

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

Steveston	Sunbury	Surrey District Municipality	Vancouver			Vedder Crossing	No.
Supplied from Greater Vancouver Water District through Richmond District Municipality	Supplied by Delta District Municipality.	Supplied from Greater Vancouver Water District; White Rock Waterworks Co., Ltd., Crescent Beach Waterworks Ltd., City of Blaine, U.S.A., and Cloverdale, B.C.	Seymour Lake	Capilano River	Coquitlam (River) Lake	A portion supplied with Chilliwack River	
			Raw and finished water			Raw and finished water	
			Spillway at reservoir	Direct from intake in mountains	At lake		
			3391	3423	3438		1
			473	474	475		2
			Aug. 10/49	Aug. 10/49	Aug. 10/49		3
			27	35	49		4
			14·0	12·5	17·0		5
			21·0	24·0 (19·0)	21·0		6
			.....	.....	.....		7
			.....	..... (3·0)	.....		8
			7·1 (7·1)	7·5 (7·2)	7·3 (6·9)		9
			5 (8)	5 (10)	10 (8)		10
			0·7	0·6	0·9		11
			.....	.....	.....		12
			.....	.....	.....		13
			16·4	19·0	12·8		14
			6·4	7·0	6·4		15
			23·9	21·8	13·5	*See* Table II.	16
See Vancouver, B.C.	*See* Delta District Municipality.	*See* Vancouver, White Rock, Crescent Beach and Cloverdale, B.C.	2·2	4·0	1·8	Station No. 22.	17
			0·2	0·3	0·2		18
			.....	.....	.....		19
			0·15	0·09	0·05		20
			1·0	0·7	0·9		21
			0·4	0·3	0·2		22
			0 (0)	0 (0)	0 (0)		23
			9·3 (7·3)	8·8 (7·3)	7·6 (7·3)		24
			2·8	6·5	2·0		25
			0	0	1·4		26
			0·05	0·20	0		27
			Trace	Trace	0		28
			.....	.....	.....		29
			4·4	4·0	3·5		30
			6·3	7·2 (6·0)	5·3		31
			0	4·0	0		32
			6·3	11·2	5·3		33
			15·8	20·4	13·9		34
			−3·1	−2·4	−3·0		35
			Vancouver supply is that of Greater Vancouver Water District.				

TABLE III—Concluded

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

No.	Municipality	Wells		West Vancouver District Municipality	Whalley
	Source(s)	Mosquito Creek	Red Gulch Creek	Supplied from Greater Vancouver Water District	Supplied by Surrey District Municipality
		Raw and unfinished water			
	Sampling Point	From intakes			
1	Laboratory number	5023	5024		
2	Field number	808	809		
3	Date of collection	Apr. 15/51	Apr. 15/51		
4	Storage period (days)	5	5		
5	Sampling temperature, °C				
6	Test temperature, °C	23·5	23·5		
7	Dissolved oxygen				
8	Carbon dioxide (CO_2)				
9	pH	7·4	7·4		
10	Colour	10	5		
11	Turbidity	0·5	0·5		
12	Suspended matter, dried at 105°C				
13	Suspended matter, ignited at 550°C				
14	Residue on evaporation, dried at 105°C	51·4	69·8		
15	Ignition loss at 550°C	11·0	5·8		
16	Specific conductance (micromhos at 25°C.)	74·6	120		
17	Calcium (Ca)	8·9	17·8	*See* Vancouver, B.C.	*See* Surrey District Municipality
18	Magnesium (Mg.)	2·9	3·4		
19	Iron (Fe) Total				
20	Dissolved	0·03	0·01		
21	Sodium (Na)	1·3	1·5		
22	Potassium (K)	0	0		
23	Carbonate (CO_3)	0	0		
24	Bicarbonate (HCO_3)	31·7	58·6		
25	Sulphate (SO_4)	9·2	11·6		
26	Chloride (Cl)	0	0		
27	Fluoride (F)	0	0		
28	Nitrate (NO_3)	0·4	0		
29	Silica (SiO_2) Gravimetric				
30	Colorimetric	5·9	10		
31	Carbonate hardness as $CaCO_3$, p.p.m.	26·0	48·0		
32	Non-carbonate hardness as $CaCO_3$, p.p.m.	8·2	10·5		
33	Total hardness as $CaCO_3$, p.p.m.	34·2	58·5		
34	Sum of Constituents	44·2	73·4		
35	Saturation index	−1·6	−1·1		
	Remarks:				

TABLE III—Concluded

Chemical Analyses of Civic Water Supplies

Fraser River Drainage Basin

(In parts per million)

White Rock					Williams Lake		No.
Graeme Spring	Civic Mixture	Well No. 1	Well No. 2	Well No. 5	Williams Lake		
Raw and finished water					Raw and finished water		
At spring	Town tap	At well	At well	At well	Direct at intake		
4089	4090	4091	4092	4093		4568	1
560	561	558	559	562		733	2
Mar. 20/50	Mar. 20/50	Mar. 20/50	Mar. 20/50	Mar. 20/50	1949	Aug. 21/50	3
12	12	12	12	12		51	4
8·9	11·1	11·7	11·7			20·6	5
21·0	21·0	21·0	21·0	21·0		21·2 (22·8)	6
							7
						(0)	8
7·7	8·2	8·2	8·2	8·0	8·0	8·5 (8·8)	9
0	0	5	5	5	15	10 (30)	10
0·3	0·2	0·3	0·3	0·5	Slight	0·6	11
							12
							13
96·2	159	537	408	153	424	346	14
19·0	12·2	13·0	16·0	12·2	100	91·8	15
129	242	895	681	242		525	16
10·0	23·2	14·6	16·6	24·4	29·8	31·3	17
3·2	8·8	9·0	9·4	9·0	40·2	37·5	18
					0·07		19
0·04	0·03	0·05	0·03	0·02		0·08	20
11·2	16·8	175	123	15·8	as Na {36·8	32·5	21
1·1	2·7	9·2	7·0	2·5	{	4·5	22
0	2·4	5·3	3·6	2·4	0	27·4 (30·0)	23
26·4	113	196	168	111	185	314 (300)	24
12·7	14·0	34·4	26·7	11·7	12·6	15·1	25
15·0	16·0	174	124	16·0	0·8	0 (0)	26
0	0·05	0·25	0·10	0·10	0	0·25	27
9·8	0·35	0	Trace	0·4	0·1	0·7	28
12	23	24	23	21	14		29
13	21	25	24	20		11	30
21·6	94·1	73·4	80·1	95·0	239·3	232	31
16·6	0	0	0	2·9	0	0	32
38·2	94·1	73·4	80·1	97·9	239·3	232	33
89·0	161	545	418	157	226	315	34
−1·4	+0·07	+0·06	+0·05	−0·12	+0·5	+1·0	35
					Analyses by Dept. Nat. Health and Welfare, Victoria, B.C. Nitrite—0 p.p.m. Fluoride—0·1 p.p.m. (1950)		

TABLE IV

Municipal Water Supplies Within the Fraser River Drainage Basin

Summary of data on area, total population and population served

Region	Approximate area[a]		Estimated total population in thousands	Estimated population in thousands served by organized water systems		Per cent population served in basin (1951)	Per cent population served (1951) with			
	Square miles	Per cent of total province	1951[b]	1949-50[c]	1951[d]		Soft water	Medium hard water	Hard water	Very hard water
Lower Fraser River Basin	8,520	2·33	644·76	644·1	564·2	87·5	95·6	1·4	3·0	.....
Central Fraser River Basin	35,530	9·70	43·66	22·3	23·0	52·6	66·1	13·5	10·4	10·0
Upper Fraser River Basin	47,390	12·94	32·91	8·4	8·6	26·1	26·7	73·3	.....	.....
Total basin in Canada	91,440	25·0	721·3	674·8	595·8	82·6	93·4	3·0	3·2	0·4
Total province	366,255 (359,280 land area)	100·0	1,165·2							

[a] Includes fresh water.
[b] Ninth census of Canada.
[c] Estimated from figures supplied by officials, and from other sources.
[d] Estimated from ninth census of Canada.

TABLE V

Municipal Water Supplies within the Fraser River Drainage Basin

Summary of data on systems, including source, treatment and hardness of waters

Region	Number of municipalities and communities served by organized systems	Number different sources[a]	Source								Per cent of systems using				Per cent of systems using surface waters	Treatment methods, 1950-51		
			Surface waters				Ground waters									None	Chlorination	
			Soft	Med. hard	Hard	Very hard	Soft	Med. hard	Hard	Very hard	Soft	Med. hard	Hard	Very hard			Alone	Additional treatment[c]
Lower Fraser River Basin	47	13(4)	8(2)	.....	1	.....	.....	4(2)	.....	.....	61·5	30·8	7·7	.....	69·2	11(3)	2	.....
Central Fraser River Basin	17	14(4)	7(4)	3	1	3	.....	.....	.....	.....	50·0	21·4	7·2	21·4	100	8(3)	4	2
Upper Fraser River Basin	5	5(1)	3(1)	2	.....	.....	.....	.....	.....	.....	60·0	40·0	.....	.....	100	3(1)[b]	1	1
Total Basin	69	32(9)	18(7)	5	2	3	.....	4(2)	.....	.....	56·3	28·1	6·3	9·3	87·5	22(7)	7	3

[a] Figures in brackets refer to number of systems not studied in detail.
[b] One source is naturally filtered.
[c] Additional treatment is natural filtration.

DISCUSSION

The basin has been divided into three general regions primarily because of the preponderance of population in the lower Fraser River basin or delta area. These regional areas are only rough estimates but do serve to indicate the density of population in each. Continual expansion of the Greater Vancouver Water District, the fact that some communities are only partially served from this District supply, and the shifting and growing population and industrial activity in the area, all tend to outdate statistics in this region.

This is apparent in the rather widely different figures given for population in various communities in 1949 and in the 1951 census. An attempt has been made to arrive at a reasonably accurate estimate using data from several sources, although generally the 1951 census figure, corrected for any known population served outside the incorporated area, has been used in compilation of the tables.

Since most of the data is based on information obtained in 1950 or 1951 no attempt has been made to estimate, by assuming a steady increase from 1941 to 1951, populations for 1949 or 1950; rather, the best data of 1951 have been used. In the preparation of the data of Tables IV and V it has once more been assumed that those systems which were not studied in detail used soft surface water without any treatment. This is a reasonable assumption since these systems are usually very small and creek waters are readily obtained by gravity.

From these tables it is noted that the Fraser River basin which is about 25 per cent of the total area of the province contains about 62 per cent of the provincial population but that about 89 per cent of the basin population or 56 per cent of the provincial population resides in the lower Fraser River basin, mostly concentrated on the delta of the river. Because of the Greater Vancouver Water District, 87·5 per cent of the population in this lower basin region is served with water by organized system, about 96 per cent of those served using soft water. Even though the other portions of the basin have much lower percentage served and generally use harder waters, about 83 per cent of the entire river basin is served with water; 93 per cent of those served using soft water.

The decrease in hardness of surface waters along the Fraser River is indicated somewhat by the data of this Table in that in the upper portion of the basin 73 per cent of those served are served with medium hard water.

The effect of the Greater Vancouver Water District is again noted in Table V in that, while about 17 communities are served in this lower river area, only about 13 systems have different water sources and some of these also use water from the Water District. In this area are the only systems using ground waters, which are medium hard in character. It is estimated that the Greater Vancouver Water District serves about 82 per cent of the population in this region with a soft water.

As in other basins in this province treatment of the water is practically nil, 69 per cent of the systems having no treatment, the remainder being only chlorinated, except for three which have, in addition, natural filtration through gravel beds.

Since the Fraser River itself is not used by any municipality and all other rivers and streams are usually clear, no clarifying treatment other than occasionally coarse screening is required.

SUMMARY

Most of this basin which contains such a large percentage of the province's population and industry has available an adequate supply of soft water cheaply distributed with little or no treatment. Even in those areas where the main rivers are such as to require at least some clarifying treatment there is usually readily available by gravity clear, soft to medium hard, mountain streams requiring no treatment.

Pollution of the basin's many water sources is inappreciable as evidenced by the lack of chlorination. Since much of the basin is only sparsely settled, industrial activity is small and water sources are in unsettled mountainous regions, it is not likely that pollution will be at all serious for many years. In the more heavily-populated areas steps have already been taken to protect from pollution the headwaters of the water sources, which are usually in nearby mountainous areas.

Water supply in this basin is adequate for a much larger population and extensive industrial use. For most industrial uses the only treatment required would be clarification of turbid waters or prevention of corrosion by the soft, oyxgen-saturated waters, typical of this province and other mountainous regions.

APPENDIX A

SAMPLING LOCATIONS OF SURFACE WATERS

APPENDIX A—Concluded

SAMPLING LOCATIONS OF SURFACE WATERS—Concluded

APPENDIX B

CIVIC WATER SUPPLIES IN THE FRASER RIVER DRAINAGE BASIN

	Data Page	Analysis Page		Data Page	Analysis Page
Abbotsford[a]	58	74	Maillardville	65	78
Armstrong[a]	58	74	Maple Ridge District Municipality	65	79
Ashcroft[a]	59	74	Matsqui District Municipality[a]	64	79
Beach Grove[a]	59	74	McBride[a]	64	79
Bralorne[a]	59	74	Merritt[a]	65	79
Bridgeport	58	74	Mission City[a]	65	79
Brighouse	58	74	Mission District Municipality	65	79
Burkeville	59	74	Newton Station	66	80
Burns Lake[a]	59	75	New Westminster	66	80
Burnaby	59	75	North Kamloops	67	80
Burquitlam	60	75	North Vancouver[a]	67	80
Canoe	60	75	North Vancouver Dis. Municipality	67	80
Chase[a]	61	—	Pitt Meadows District Municipality	66	81
Chilliwack[a]	61	75	Port Coquitlam	67	81
Chilliwhack District Municipality	61	75	Port Mann	66	81
Clinton[a]	60	75	Port Moody	67	81
Cloverdale[a]	60	76	Prince George[a]	67	81
Coquitlam District Municipality	61	76	Quesnel[a]	68	81
Crescent Beach[a]	61	76	Richmond District Municipality	69	82
Delta District Municipality	61	76	Rosedale	68	82
East Richmond	62	76	Salmon Arm[a]	69	82
Eburne	62	76	Salmon Arm District Municipality	69	82
Enderby[a]	62	77	Sardis	68	82
Essondale	63	77	South Westminster	68	82
Fraser Mills District Municipality	63	77	Steveston	69	83
Gold Bridge[a]	63	77	Sunbury	69	83
Haney	62	77	Surrey District Municipality	69	83
Harrison Hot Springs[x]	62	77	Vancouver[a]	70	83
Hope[a]	63	77	Vedder Crossing[a]	70	83
Ioco[a]	63	—	Walhachin[a]	71	—
Kamloops[a]	63	78	Wells[a]	71	84
Kennedy	64	78	West Vancouver Dis. Municipality	71	84
Ladner	64	78	Whalley	72	84
Lillooet[a]	64	78	White Rock[a]	72	85
Lytton[a]	65	78	Williams Lake[a]	72	85

[a]Communities known to have separate or different sources of supply.
[x]No organized water system.

NOTE

THE LIMITS OF THE ARBITRARY SUBDIVISIONS OF THE FRASER RIVER DRAINAGE BASIN AS SHOWN ON THIS MAP ARE INCORRECT.

THE NORTHERN LIMIT OF THE CENTRAL BASIN LIES ALONG LATITUDE 52° 00'. THE SOUTHERN LIMIT FOLLOWS THE HIGH LAND NORTH OF THE LILLOOET RIVER, CROSSING THE FRASER RIVER SOUTH OF LYTTON AND THENCE TO THE HEADWATERS OF THE COQUIHALLA RIVER.

REF: PP. 66 AND 67 OF TEXT.

CANADA
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MINES AND TECHNICAL SURVEYS

MINES BRANCH

FIGURE 2

Civic water supplies and locations of sampling stations, Fraser River drainage basin, British Columbia

Scale: 1 Inch to 30 Miles = 1:900,800

LEGEND

Civic Supplies	Sampling Stations
Total Hardness as ppm $CaCO_3$	
Unknown . . . . . ×	Daily Sampling . . ♦
0-60 . . . . . ○	Monthly Sampling . ▼
61-120 . . . . . ◎	Spot Sampling . . . ◊
121-180 . . . . . ◑	
Over 180 . . . . . ●	

Boundary of drainage basin
Municipality boundary (on inset map)

PUBLISHED 1954

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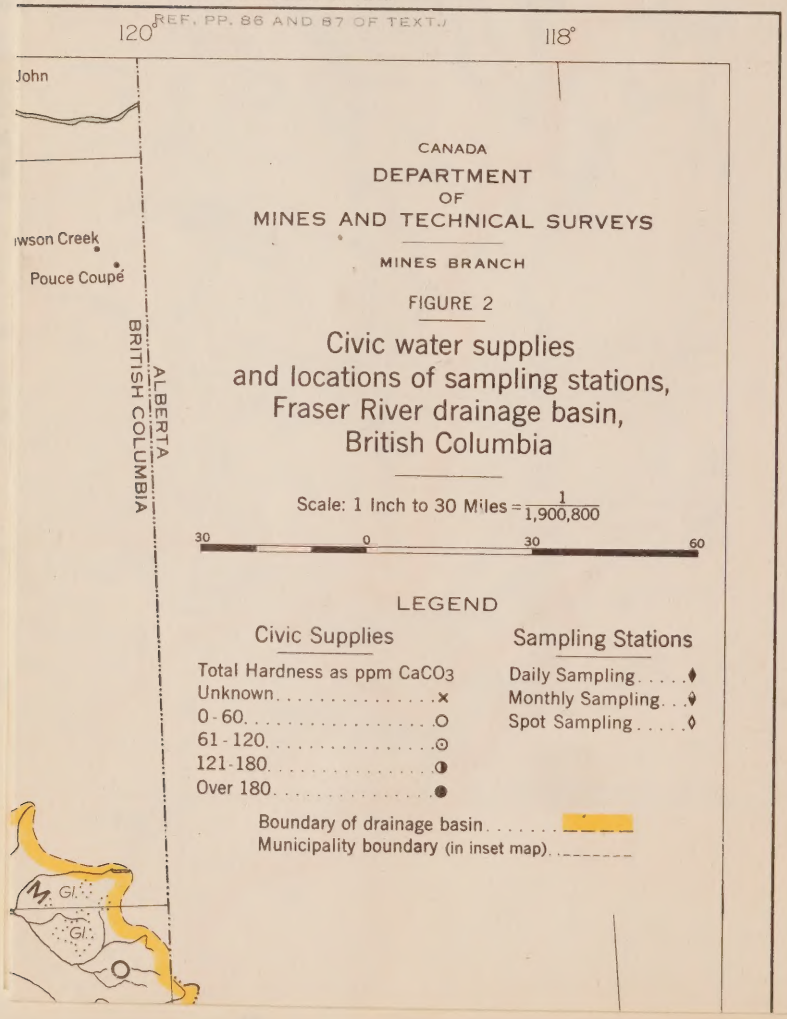
NOTE

THE LIMITS OF THE ARBITRARY SUBDIVISIONS OF THE FRASER RIVER DRAINAGE BASIN AS SHOWN ON THIS MAP ARE INCORRECT.

THE NORTHERN LIMIT OF THE CENTRAL BASIN LIES ALONG LATITUDE 52° 30'; THE SOUTHERN LIMIT FOLLOWS THE HEIGHT OF LAND NORTH OF THE LILLOOET RIVER, CROSSING THE FRASER RIVER SOUTH OF LYTTON AND THENCE TO THE HEADWATERS OF THE COQUIHALLA RIVER.

(REF. PP. 86 AND 87 OF TEXT.)



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DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

MINES BRANCH

FIGURE 2

Civic water supplies and locations of sampling stations, Fraser River drainage basin, British Columbia

Scale: 1 Inch to 30 Miles = $\frac{1}{1,900,800}$

30 0 30 60

LEGEND

Civic Supplies

Total Hardness as ppm $CaCO_3$
Unknown . . . . . ×
0-60 . . . . . ○
61-120 . . . . . ⊙
121-180 . . . . . ◑
Over 180 . . . . . ●

Sampling Stations

Daily Sampling . . . . . ⧫
Monthly Sampling . . . ⧫
Spot Sampling . . . . . ◊

Boundary of drainage basin . . . . . ▬▬▬
Municipality boundary (in inset map) . . . . . ▬ ▬ ▬